PHILIPS 29PT9007

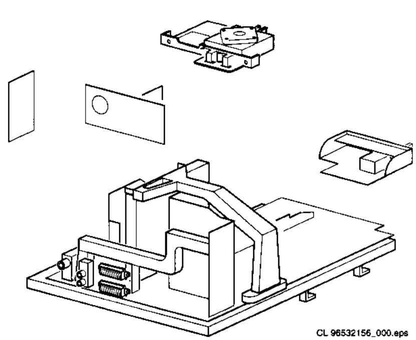
MODEL

SERVICE MANUAL

Colour television **Chassis**

EM2E
AA

Service
Service
Service



Service Manual

Contents

	Contents		Page	
1	Technical specifications, connection facilities and chassis overview		2	
2	Safety instructions, maintenance, warnings and notes		4	
3	Directions for use		5	
4	Mechanical instructions		17	
5	Service modes, error codes, faultfinding and repair tips.		19	
6	*Block diagrams*			
	Block diagram (Supply, Deflection)		33	
	Block diagram (Video, Audio, Control)		34	
	Supply lines overview		35	
	Wiring diagram		36	
	I^{2}C overview		36	
	Survey of testpoints		37	
7	*Electrical Diagrams and PWB lay-outs*		*Diagram*	*PWB*
	Main supply	(Diagram A1)	38	45-50
	Stand-by Supply	(Diagram A2)	39	45-50
	Line deflection	(Diagram A3)	40	45-50
	Frame deflection / rotation	(Diagram A4)	41	45-50
	Audio amplifier	(Diagram A5)	42	45-50
	Headphone amplifier	(Diagram A6)	43	45-50
	Tuner, I/O, SIMM (female)	(Diagram A7)	44	45-50
	Front	(Diagram A8)	43	45-50
	SIMM (male)	(Diagram B1)	51	57-66
	IF, I/O, Video processing (HIP)	(Diagram B2)	52	57-66
	Featurebox (PICNIC)	(Diagram B3)	53	57-66
	Video control & Geometry (HOP)	(Diagram B4)	54	57-66
	Teletext & Control (OTC)	(Diagram B5)	55	57-66
	Audio processing	(Diagram B6)	56	57-66
	Mains switch panel	(Diagram E)	67	67
	CRT panel	(Diagram F)	68	67
	Side I/O panel	(Diagram O)	69	69
	Top control	(Diagram P)	70	70

	Contents	Page
8	Electrical alignments	71
9	Circuit Descriptions	76
	List of abbreviations	92
10	Spare parts list	94

©Copyright reserved 2000 Philips Consumer Electronics B.V. Eindhoven, The Netherlands. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by CO 0061 Service PaCE   Printed in the Netherlands   Subject to modification   GB 3122 785 10310

PHILIPS

1. Technical specifications, connection facilities and chassis overview

1.1 Technical specifications

1.1.1 Reception

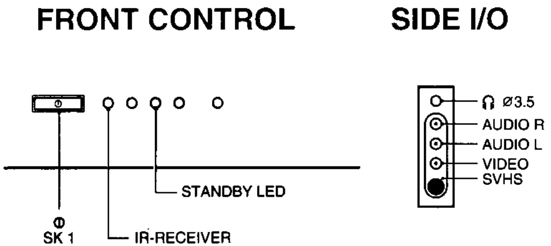
Tuning system : PLL
Reception :
TV systems off air : PAL B/G/I, SECAM B/G/L/L' for Western Europe
: PAL B/G, SECAM B/G/D/K, NTSC M for Eastern Europe
Sound systems : FM
: AM
: NICAM B/G/D/K/I
A/V connections : PAL B/G/D/K/I
: SECAM B/G/D/K/L/L'
: NTSC video playback
Channel selections : 100 channels: VHF, UHF, S-Channels, Hyperband
Frequency range : 44.25 - 855.25 MHz
Aerial input : Coaxial 75Ω
VCR preselections : 0 and 90 - 99

1.1.2 Miscellaneous

Mains voltage : 220V - 240V (± 10 %); 50 - 60Hz (± 5 %)
Ambient temperature : +5 to +45 deg. Celcius
Standby Power Consumption : < 1W

1.2 Connection facilities

1.2.1 Side I/O connections



CL96532156_001.eps
060100

Figure 1-1

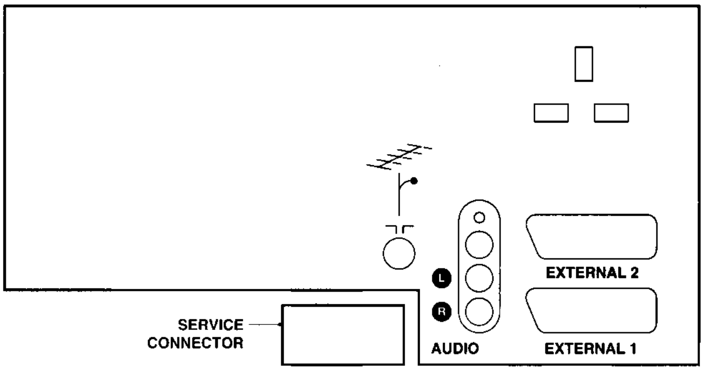
Audio / video

-	- Video (CVBS)	$1V_{PP}$ / 75Ω	⊕◎
-	- Audio	L ($0.5V_{RMS}$ / 10kΩ)	⊕◎
-	- Audio	R ($0.5V_{RMS}$ / 10kΩ)	⊕◎
-	- Headphone	(32 - 2000Ω / 10mW)	

SVHS

1 -	GND	⏚
2 -	GND	⏚
3 - Y	($1V_{PP}$ / 75Ω)	⊕
4 - C	($0.3V_{PP}$ / 75Ω)	⊕

1.2.2 Rear connections



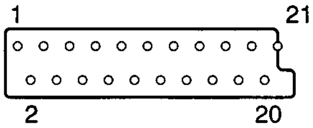
CL96532156_002.eps
060199

Figure 1-2

Audio

-	- Audio	L ($0.5V_{RMS}$ / 10kΩ)	⊖▸◎
-	- Audio	R ($0.5V_{RMS}$ / 10kΩ)	⊖▸◎

External 1 (in/out): RGB+CVBS

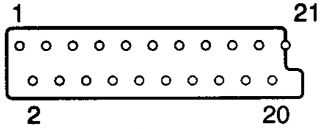


CL96532137_056.eps
171199

Figure 1-3

1	- Audio	R ($0.5V_{RMS}$ / 1kΩ)	⊖▸
2	- Audio	R ($0.5V_{RMS}$ / 10kΩ)	⊕
3	- Audio	L ($0.5V_{RMS}$ / 1kΩ)	⊖▸
4	- Audio	GND	⏚
5	- Blue	GND	⏚
6	- Audio	L ($0.5V_{RMS}$ / 10kΩ)	⊕
7	- Blue	($0.7V_{PP}$ / 75Ω)	⊕
8	- CVBS-status	0 - 1.3V: INT, 4.5 - 7V: EXT 16:9, 9.5 - 12V: EXT 4:3	
9	- Green	GND	⏚
10-			
11-	Green	($0.7V_{PP}$ / 75Ω)	⊕
12-			
13-	Red	GND	⏚
14-	RGB-status	GND	⏚
15-	Red	($0.7V_{PP}$ / 75Ω)	⊕
16-	RGB-status	0 - 0.4V: INT 1 - 3V: EXT / 75Ω	
17-	CVBS	GND	⏚
18-	CVBS	GND	⏚
19-	CVBS	($1V_{PP}$ / 75Ω)	⊖▸
20-	CVBS	($1V_{PP}$ / 75Ω)	⊕
21-	Earth	GND	⏚

External 2 (in/out): SVHS+CVBS (intended for VCR)

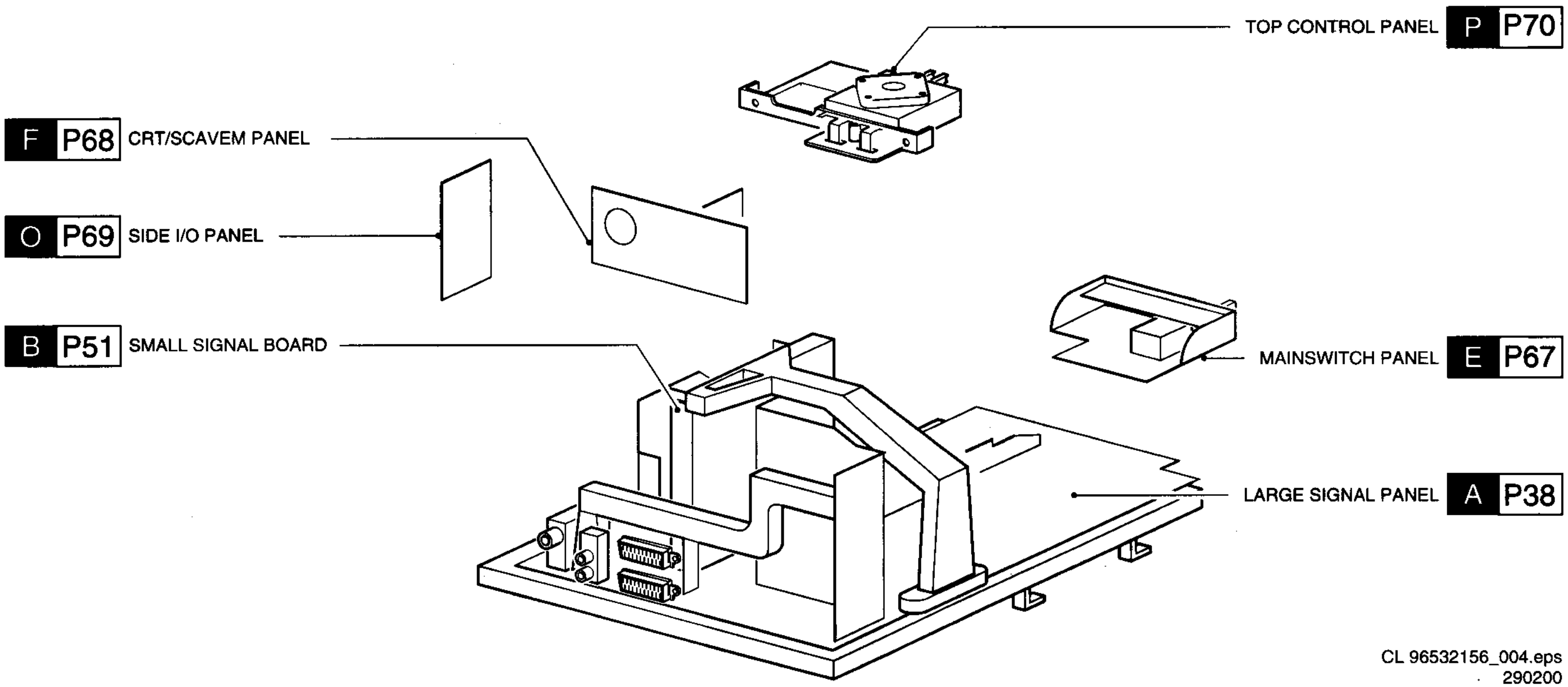


CL96532137_056.eps
171199

Figure 1-4

1 - Audio	R (0.5V_{RMS} / 1kΩ)	⊖→
2 - Audio	R (0.5V_{RMS} / 10kΩ)	⊕
3 - Audio	L (0.5V_{RMS} / 1kΩ)	⊖→
4 - Audio	GND	⏚
5 -	GND	⏚
6 - Audio	L (0.5V_{RMS} / 10kΩ)	⊕
7 -		
8 - CVBS-status	0 - 1.3V: INT, 4.5 - 7V: EXT 16:9, 9.5 - 12V: EXT 4:3	
9 -	GND	⏚
10-	Easy link	
11-		
12-		
13- Red	GND	⏚
14- RGB-status	GND	⏚
15- C	(0.7V_{PP} / 75Ω)	⊕
16-		
17- CVBS	GND	⏚
18- CVBS	GND	⏚
19- CVBS	(1V_{PP} / 75Ω)	⊖→
20- Y/CVBS	(1V_{PP} / 75Ω)	⊕
21- Earth	GND	⏚

1.3 Chassis overview


TOP CONTROL PANEL
P P70
F P68
CRT/SCAVEM PANEL
O P69
SIDE I/O PANEL
B P51
SMALL SIGNAL BOARD
MAINSWITCH PANEL
E P67
LARGE SIGNAL PANEL
A P38

CL 96532156_004.eps
290200

Figure 1-5

2. Safety & Maintenance instructions, Warnings and Notes

2.1 Safety instructions for repairs

Safety regulations require that during a repair:

- Due to the EM2E concept, a very large part of this chassis (incl. Hor. & Vert. deflection) is 'hot'. Therefore the set must be connected to the mains via an isolating transformer.
- Safety components, indicated by the symbol ⚠, should be replaced by components identical to the original ones.
- When replacing the CRT, safety goggles must be worn.

Safety regulations require that after a repair, the set must be returned in its original condition. In particular attention should be paid to the following points:

- General repair instruction: as a strict precaution, we advise you to resolder the solder joints, through which the horizontal deflection current is flowing, in particular:
  - All pins of the line output transformer (LOT);
  - Fly-back capacitor(s);
  - S-correction capacitor(s);
  - Line output transistor;
  - Pins of the connector with wires to the deflection coil;
  - Other components through which the deflection current flows.

Note: This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.

- The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
- The insulation of the mains lead should be checked for external damage.
- The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
- The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
  - Unplug the mains cord and connect a wire between the two pins of the mains plug;
  - Set the mains switch to the 'ON' position (keep the mains cord unplugged!);
  - Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
  - Switch off the TV and remove the wire between the two pins of the mains plug.
- The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

2.2 Maintenance instructions

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
  - Execute the above-mentioned 'general repair instruction'.
  - Clean the power supply and deflection circuitry on the chassis.
  - Clean the picture tube panel and the neck of the picture tube.

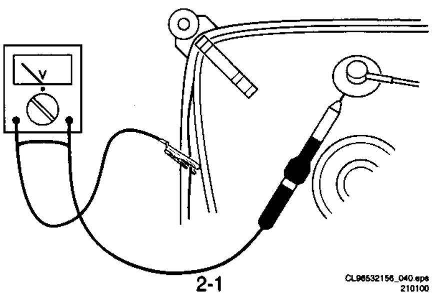
2.3 Warnings

- In order to prevent damage to IC's and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 2-1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position VDC). Discharge until the meter reading is 0 V (after approx. 30 s).
- ⚠ All IC's and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Together with the deflection unit and any multipole unit, the used flat square picture tubes form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
- Be careful during measurements in the high-voltage section and on the picture tube.
- Never replace modules or other components while the unit is switched ON.
- When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
- Wear safety goggles during replacement of the picture tube.

2.4 Notes

- The direct voltages and oscillograms should be measured with regard to the tuner earth (⏚) or hot earth (⏚).
- The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.
- Where necessary, the oscillograms and direct voltages are measured with (┬) and without (⊻) aerial signal. Voltages in the power supply section are measured both for normal operation (⏽) and in Standby (⏻). These values are indicated by means of the appropriate symbols.
- The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories Licensing Corporation. DOLBY, the double D symbol and PRO LOGIC are trademarks of Dolby Laboratories Licensing Corporation.

DOLBY SURROUND
PRO • LOGIC



2-1

3. Directions for use

Contents

Installation

Your remote control *2*
Preparation *3*
Installation *4*
Store TV channels *4*
  Select the menu language and country *4*
  Automatic installation *5*
  Manual installation *5*
Give name *6*
Reshuffle the programme list *6*
Select favourite TV channels *6*
Install TV setup *7*

Operation

Use of the remote control *8-9*
Use of the menus
  Picture menu *10*
  Sound menu *10*
  Features menu *11*
NEXTVIEW *12-15*
Teletext *16-18*

The keys on top of the TV *18*

Connect peripheral equipment

Connecting and selecting equipment *19-22*
Remote control functions for peripherals *22-23*
Recording *24*

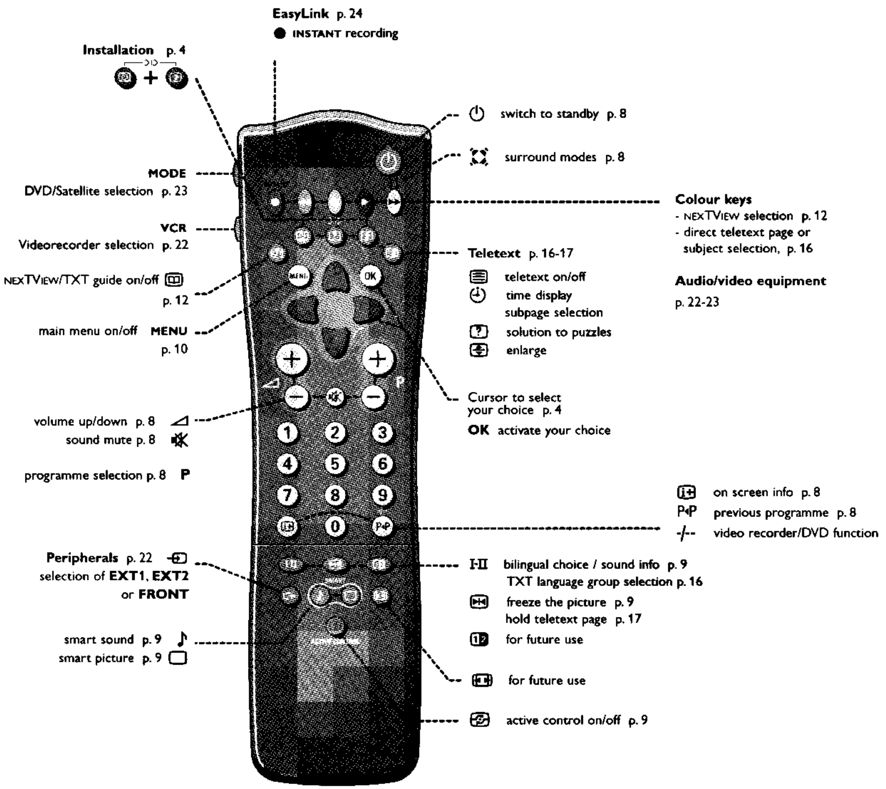
Tips *25*
Index *25*
Glossary *26*

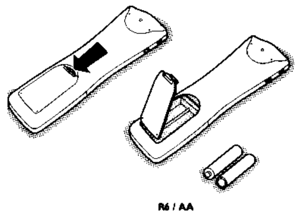
EasyLink features are based on the "one touch operation" approach. This means that a sequence of actions are executed at the same time in both the television and the video cassette recorder, ***provided both are fitted with the EasyLink function*** *and connected with the eurocable supplied with your video recorder.*

English

Preparation

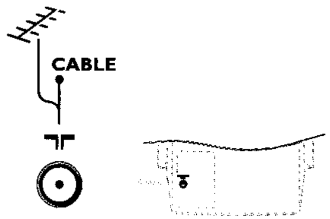
Your remote control


EasyLink p. 24
● INSTANT recording
Installation p. 4
MODE
DVD/Satellite selection p. 23
VCR
Videorecorder selection p. 22
NEXTVIEW/TXT guide on/off
p. 12
main menu on/off **MENU**
p. 10
volume up/down p. 8
sound mute p. 8
programme selection p. 8 **P**
Peripherals p. 22
selection of **EXT1**, **EXT2** or **FRONT**
smart sound p. 9
smart picture p. 9
switch to standby p. 8
surround modes p. 8
Colour keys
- NEXTVIEW selection p. 12
- direct teletext page or subject selection, p. 16
Audio/video equipment
p. 22-23
Teletext p. 16-17
teletext on/off
time display
subpage selection
solution to puzzles
enlarge
Cursor to select your choice p. 4
OK activate your choice
on screen info p. 8
P◂P previous programme p. 8
-/-- video recorder/DVD function
I-II bilingual choice / sound info p. 9
TXT language group selection p. 16
freeze the picture p. 9
hold teletext page p. 17
for future use
for future use
active control on/off p. 9



Preparation

1. **Place the TV on a solid surface.**
   For ventilation, leave at least 5 cm free all around the TV.
   Do not place the TV on a carpet.
   To prevent any unsafe situations, do not place any objects on top of the TV.
   Avoid heat, direct sunlight and exposure to rain or water.
2. **Insert the aerial plug** firmly into the aerial socket ⊤ at the back of the TV.



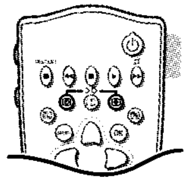
3. Insert the mains plug in the wall socket having a mains voltage of 220V-240V. To prevent damaging the mains (AC) cord which could cause a fire or electric shock, do not place the TV on the cord.
4. Remote control: Remove the cover of the battery compartment.
   Insert the 2 batteries supplied (Type R6-1.5V).

   The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries exhausted batteries may not be disposed of with your household waste. Please check on how to dispose of exhausted batteries according to local regulations.

   Note: this remote control functions with TVs which use the RC6 signalling standard.
5. **Switch the TV on** : Press the power switch ⏻ on the front of your TV.
   A red indicator on the front of the TV lights up and the screen comes on.
   If the TV is in standby mode (see p. 8), press the **- P+** key on the remote control.
   *When you switch on your set **for the first time**, the menu* **LANGUAGE** *automatically appears on the screen. The explanation appears in different languages one at a time. Choose your own language and press the* **OK** *key on the remote control.*

Go on to page 4, Store TV channels.

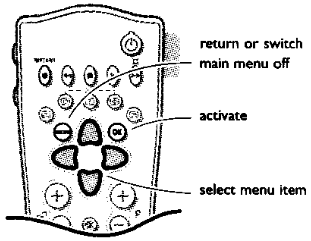
Installation



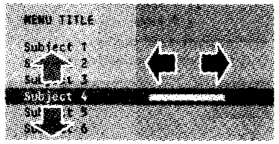
Select the INSTALLATION menu

Press ⓘ and ⊜ at the same time.

To use the menus



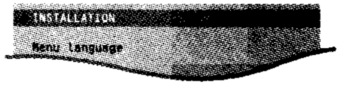
1. Use the cursor in the up/down, left/right directions to select a menu item.
2. Press the **OK** key to activate.
3. Use the **MENU** key to return or to switch the menu off.

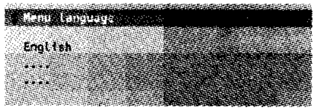


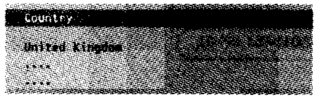
Store TV channels

*After the new or extra TV channels have been stored, the TV automatically transfers those TV channels to the video recorder if it is equipped with the EasyLink function. The message **EasyLink : downloading ......** appears on the screen. The programme list of the video recorder is now the same as the one of the TV. If the TV is connected to a video recorder which supports the NEXTVIEWLink function, the TV also automatically transfers the language and country selections to the video recorder.*

Select the menu language and country







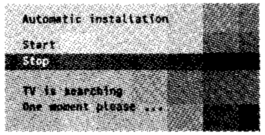
First, select your language and country.

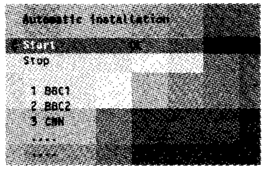
1. Select **Menu language** and press the **OK** key.
2. Select your language and press the **OK** key.
   Use the cursor up/down to scroll through the list and to bring up other languages which are not displayed on the screen at present.
3. Select **Country** and press the **OK** key.
4. Select the country where you are now located and press the **OK** key.
   Use the cursor up/down to scroll through the list and bring up other countries which are not displayed on the screen at present.

   Select **Other** when none of the countries applies.

   You can now search for and store the TV channels in two different ways: using **automatic installation** or **manual installation** (tuning-in channel by channel).
   Select your choice and press the **OK** key.

Automatic installation


Automatic installation
Start
Stop
TV is searching
One moment please ...


Automatic installation
Start
Stop
1 BBC1
2 BBC2
3 CNN
....

In the Automatic installation menu select **Start** and press the **OK** key to activate the searching. All TV channels are searched for and stored automatically.

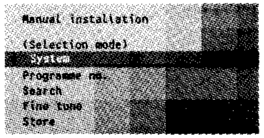
If a cable system which broadcasts ACI (Automatic Channel Installation) or a TV channel transmitting a teletext page with the frequencies and programme names of all the TV channels which can be received, is detected, the search is stopped and a programme list appears.
The programme list is automatically filled with all the programme numbers and names of the TV channels transmitted.

It is possible that the cable company or the TV channel displays a broadcast selection menu. Layout and items are defined by the cable company or the TV channel. Make your choice with the cursor and press the ***OK*** *key.*

To exit from the menu press the **MENU** key on the remote control.

Go on to page 6.

Manual installation


Manual installation
(Selection mode)
System
Programme no.
Search
Fine tune
Store

Searching for and storing TV channels is done channel by channel.
You must go through every step of the Manual installation menu.

Selection mode is only present and lights up if the country selected also offers the channel option (C-channels for aerial channels, S-channels for cable channels).
You can choose either channel or frequency mode.

❶ Select the TV system
Select the country or part of the world from where you want to receive the TV channel.
If you are connected to a cable system, select your country or part of the world where you are now located.

❷ Press the cursor down and enter the programme number with the digit keys.

❸ Search for a TV channel
Press the cursor left/right.
The frequency or the channel number increases until a TV channel is found.

Direct selection of a TV channel
If you know the frequency, the C- or S-channel number, enter it directly with the digit keys 0 to 9.
Ask for a list from your cable company or dealer, alternatively consult the Table of frequencies on the inside backcover of this handbook.

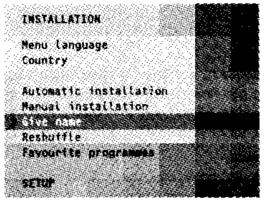
❹ Fine tune
In case of poor reception, you can improve the reception by adjusting the frequency with the cursor left/right.

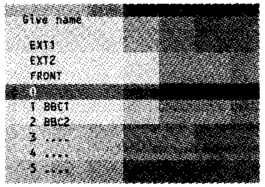
❺ To store your TV channel, select **Store** and press the **OK** key.

Repeat steps ❶ to ❺ to store another TV channel.

❻ To exit from the menu press the **MENU** key on the remote control.

Give name


INSTALLATION
Menu language
Country
Automatic installation
Manual installation
Give name
Reshuffle
Favourite programmes
SETUP

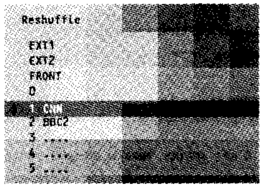

Give name
EXT1
EXT2
FRONT
0
1 BBC1
2 BBC2
3 ....
4 ....
5 ....

It is possible to change the name stored in the memory or to assign a name to a TV channel which has not yet been entered. A name with up to 5 letters or numbers can be given to the programme numbers 0 to 99. For example SUPER, BBC1,... Between 99 and 0 you can also name any peripherals that are connected to a euroconnector.

❶ Select **Give name** in the **INSTALLATION** menu and press the **OK** key.
❷ Select the programme number.
❸ Press the **OK** key.
❹ Select the character with the cursor up/down.
❺ Select the following position with the cursor right.
❻ Select the following character.
❼ Press the **OK** key when finished.
❽ Press the **MENU** key to return to the **INSTALLATION** menu.

Space, numbers and other special characters are located between Z and A.

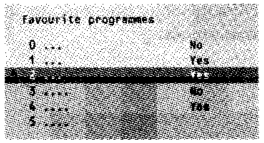
Reshuffle the programme list


Reshuffle
EXT1
EXT2
FRONT
0
1 CNN
2 BBC2
3 ....
4 ....
5 ....

According to your preference you **can** change the order of the stored TV channels.

❶ Select **Reshuffle** in the **INSTALLATION** menu and press the **OK** key.
❷ Select the programme number you want to exchange.
❸ Press the **OK** key.
❹ Select the new number you want to exchange it with.
❺ Press the **OK** key.
Repeat the operation until all TV channels are allocated as you like.
❻ Press the **MENU** key to return to the **INSTALLATION** menu.

Select Favourite TV channels

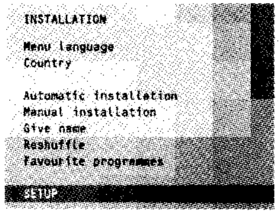

Favourite programmes
0 ... No
1 ... Yes
2 ... Yes
3 .... No
4 .... Yes
5 ....

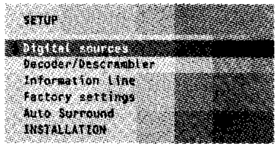
After leaving the installation you can browse through the TV channels by pressing the **- P +** key. Only those TV channels which are in the favourite list will be displayed. Non-favourite TV channels can still be selected with the digit keys. By default all stored channels are added to the favourite list.

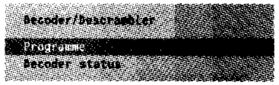
❶ Select **Favourite programmes** in the **INSTALLATION** menu and press the **OK** key.
❷ Select your favourite programme number.
❸ Select **Yes** or **No** with the cursor left/right.
❹ Repeat for every TV channel you want to make a favourite or a non-favourite TV channel.
❺ Press the **MENU** key to return to the **INSTALLATION** menu.

In order for NEXTVIEW *to function properly, the first TV channel from the favourite list should also broadcast the correct local date and time via teletext.*

Install TV Setup







The Setup menu allows you to adjust initial settings, i.e. those which are not related to the installation of the TV channels.
The Setup menu contains items that control the settings of the TV's functions, features, services and peripherals you may have connected.

❶ Use the cursor in the up/down, left/right directions to select the menu item.
❷ Use the **OK** key to activate.
❸ Use the **MENU** key to return or switch menu off.

Digital sources
See Connect Peripheral Equipment, p. 20 to connect your digital equipment, like a DVD, a digital satellite tuner or a similar digital device.

Define Decoder/Descrambler programme numbers
If a decoder or a descrambler is connected, see p. 19 you can define one or more programme numbers as decoder programme numbers.

Press the cursor left/right to select the input used to connect to your decoder **Off**, **EXT1** or **EXT2**.
Select **Off** if you do not want the selected programme number being activated as a decoder programme number.

Select **EXT2** *when the decoder is connected to your EasyLink video recorder. When selecting the decoder, the message* ***EasyLink: downloading presets....*** *appears on the screen.*

Information line
Select **On** and after the selection of a TV programme or after pressing the i+ key on the remote control, a TV channel which broadcasts teletext may transmit the name of the TV channel, the programme name or another message. This is displayed on screen next to information about sound.
When selected **Off**, only sound information is displayed after the selection of a TV channel or after pressing the i+ key.

Factory settings
Select **Factory settings** and press the **OK** key to restore picture and sound settings, predefined in the factory.

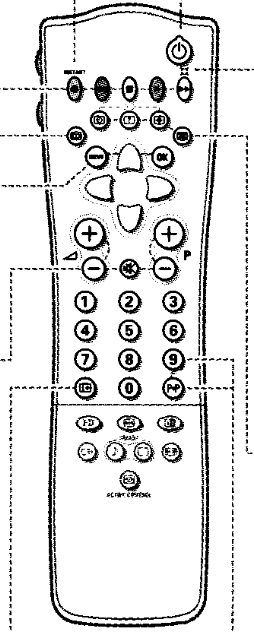
Auto Surround
Sometimes the broadcaster transmits special signals for Surround Sound encoded programmes. In that case, the TV automatically switches to the best Surround Sound mode when Auto Surround is switched on. Virtual Dolby will be reproduced, see p. 8.
Overruling this surround mode remains possible.

Installation
Select **Installation** and press the **OK** key to return immediately to the **INSTALLATION** menu.

❹ To exit from the menu press the **MENU** key repeatedly.

Operation

Use of the remote control



● **Instant record**
If your video recorder has the EasyLink function the **INSTANT** ● key for record can be operated in the TV mode.

● ◀◀ ■ ▶ ▶▶ **Video recorder** see p. 22

▤ **NEXTVIEW/TXT guide** on/off see p. 12

MENU Main menu on/off see p. 10

OK Press this key to activate your choice, when in the menus.

◢ **Volume**
Press + or - to adjust the volume.

🔇 **Mute**
Temporarily interrupt the sound or restore it.

P Programme selection
To browse through the TV channels activated in the Favourite Programme menu.

i+ **Screen information**
Press for 5 seconds to activate/de-activate the extended or reduced display of TV channel and programme information on the screen.
Press briefly to display information about the selected TV channel and programme, the sound reception, picture settings and the remaining time set with the sleeptimer.

⏻ **Standby**
The set is switched off.
To switch the TV on again, press - **P +** or the digit keys.
If your EasyLink video recorder has the system standby function and you press the standby key for 3 seconds, **both the TV and video recorder are switched to standby.**
Your TV consumes energy in the standby mode. Energy consumption contributes to air and water pollution. We advise to switch off your TV overnight instead of leaving it on standby. You save energy.

Surround modes
Incredible Surround
- In **MONO** sound mode, this feature, when switched on, enables you to hear a spatial effect of sound.
- In **STEREO** sound mode, when **Incredible Surround** is selected, it seems as though the loudspeakers are spread further apart from one another.

Virtual Dolby *(optimal with Dolby Surround signals)*
Virtual Dolby enables you to experience the effect of Dolby Surround Pro Logic, reproducing a rear sound effect

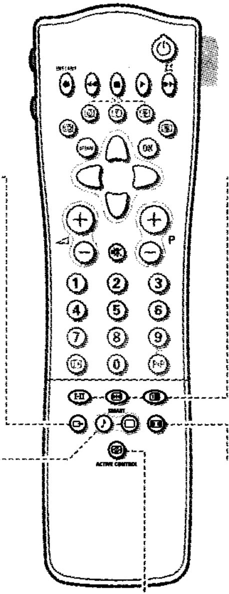
▤ **Teletext** on/off see p. 16

? ⊕ **Teletext functions** see p. 17

◷ **Time display**
The time, downloaded from the TV channel (with teletext) stored on programme number **1** or the lowest favourite programme number, is displayed on the screen.
This function is not available when continuous subtitles have been switched on.

0/9 Digit keys
To select a TV channel.
For a two digit programme number, enter the second digit within 2 seconds.
To switch immediately to a selected one digit TV channel, keep the digit key pressed a bit longer.

P◂P Previous programme
The previously selected TV channel is displayed.
The -/-- indication is only video recorder/DVD.



Select peripherals

Press this key repeatedly to select **EXT1**, **EXT2** or **FRONT**, according to where you connected the peripherals (p. 22).

Smart Keys

To select predefined picture and sound settings.

♪ **Smart Sound**

Each time it is pressed, a different sound setting is selected, corresponding with specific factory setting of the equalizer.

Smart Picture

Each time it is pressed, a different picture setting is selected, corresponding with specific factory settings of Contrast, Colour, Sharpness and Dynamic Contrast.

Personal refers to the personal preference settings of picture and sound selected in the picture and sound menu.
Remark: the moment you are in a predefined smart sound or picture setting and you modify a setting in the picture or sound menu, all values of the menu will overwrite the previously made settings.

I-II Bilingual choice and sound mode selection

Press this key
- to switch from **Stereo** to **Mono** sound, in case of stereo transmission, or from **Nicam Stereo** to **Nicam available**, in case of digital transmission;
- to choose between language I (Dual I) or language II (Dual II), in case of bilingual transmission. The setting is separately stored for each TV channel.

Freeze

To activate/de-activate the frozen picture or to hold a teletext page.

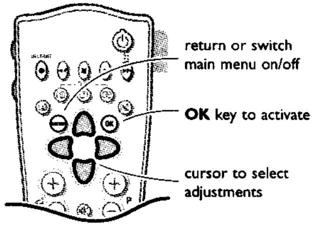
12 for future use

for future use

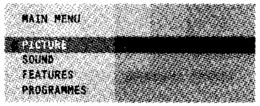
Active control

Active control is a pro-active and automatic system. The TV continuously measures and corrects all incoming signals in order to provide the best picture possible.
Press the key to select the Active Control values Off or On.
Off Sharpness and Dynamic Contrast are controlled automatically
On Sharpness, Dynamic Contrast and Noise Reduction are controlled automatically.
Press the cursor in the up/down directions while the selected Active Control setting information is on top of the screen.
The Active Control menu appears.
The picture settings are being adapted continuously and automatically.
The menu items cannot be selected.
Press the cursor in the up/down directions again to switch off the menu.

Use of the menus

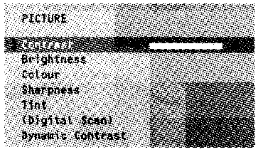

return or switch main menu on/off
OK key to activate
cursor to select adjustments

1. Press the **MENU** key to display/cancel the **MAIN MENU**.
2. Use the cursor in the up/down directions to select the **PICTURE, SOUND** or **FEATURES** menu or to select the **PROGRAMMES**.
3. Press the cursor right to activate the selected menu.
4. Use the cursor in the up/down, left/right directions to select the menu item.
5. Use the **OK** key to activate.
6. Press the **MENU** key repeatedly to **return** or to switch the menu off.



Picture menu

If an NTSC peripheral is connected to one of the euroconnectors, the option Hue also appears.



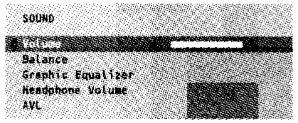
Tint
Select the colour temperature: **Normal, Warm** or **Cool**.

Digital Scan (Line Flicker Reduction) *(if provided)*
In certain circumstances while watching TV programmes it may be preferable to switch off the digital scan line flicker reduction.
Press the cursor left/right to select **On** of **Off**.

Dynamic Contrast
To make the contrast in the darker and the brighter picture areas more noticeable, select the **Med** setting.
In certain circumstances it may be preferred to select **Min, Max** or **Off**.

The modified adjustments for Contrast, Brightness, Colour, Sharpness, Tint, (Digital Scan) and Dynamic Contrast are automatically stored for all TV channels.
Select **Factory settings** in the Setup menu to restore the predefined factory settings, see p. 7.

Sound menu

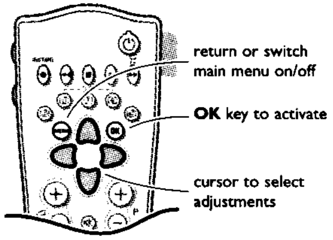


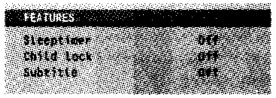
The modified adjustments for Volume, Balance, Treble and Bass are automatically stored for all TV channels.
Select **Factory settings** in the Setup menu to restore the predefined factory settings, see p. 7.

Graphic Equalizer
Here you can select the preferred sound setting which corresponds with the personal sound settings.

Headphone volume
See Connect Peripheral Equipment, p. 21, for the connection of the headphone.

AVL (Automatic Volume Leveller)
AVL automatically controls the volume level to avoid too large level differences, especially when switching to another programme or during commercial breaks.


return or switch main menu on/off
OK key to activate
cursor to select adjustments


FEATURES
Sleeptimer Off
Child lock Off
Subtitle Off

Features menu

- ❶ Press the **MENU** key to display/cancel the **MAIN MENU**.
- ❷ Use the cursor in the up/down directions to select the **FEATURES** menu.
- ❸ Press the cursor right to activate the selected menu.
- ❹ Use the cursor in the up/down directions to select a menu item.
- ❺ Use the cursor in the left/right directions to select the desired setting.

Sleeptimer

With the sleeptimer you can set a time period after which the TV should switch itself to standby.
The counter runs from **Off** up to **180 min.**
One minute before the TV is set to go to standby, the remaining seconds appear on screen. You can always switch off your set earlier or change the set time.

Child lock

If the child lock is on, the TV can only be switched on with the remote control. The **P** - and + keys on top of the TV cannot be used to select a TV channel. In this way you can prevent unauthorised use of your TV.
If the message **Child lock On** appears, the child lock must be switched off before you can use the **P** - and + keys on top of the TV to select a TV channel.

Subtitle

TV channels with teletext often transmit certain programmes with subtitling. See Teletext, Continuous Subtitles, p. 18 how to select the proper subtitle page from the teletext index.
Select **Subtitle On** or **Off**.

Press the **MENU** key to switch off the Features menu.

Programme list

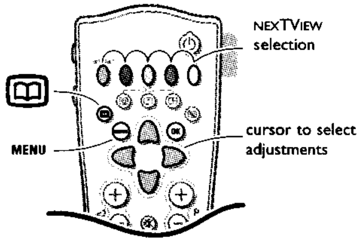
- ❶ Press the **MENU** key to display/cancel the **MAIN MENU**.
- ❷ Select **PROGRAMMES** with the cursor up/down.
- ❸ Press the cursor right to display an overview of all the TV channels installed.
- ❹ Press the cursor up/down to run through the list and press **OK** to select the desired TV channel.
- ❺ Press the **MENU** key to switch off the Programme list.

NEXTVIEW / Teletext Guide

Today, most broadcasters in Europe, are offering teletext pages containing their programme schedule of today. These pages can be requested by switching the TV to **Teletext Guide**.
An increasing number of broadcasters are offering an extended programme guide service called **NEXTVIEW**. NEXTVIEW is a new way of presenting programme schedules and offers more features than common teletext.
With NEXTVIEW it is possible to show for instance all the movies coming tonight.

Both facilities are integrated in this TV: NEXTVIEW and Teletext Programme Guide. If a TV channel supports NEXTVIEW then the TV will automatically present the NEXTVIEW programme schedule. If the TV channel supports just teletext, then the TV will switch automatically to Teletext Guide.
Both facilities are offering the same functions: record, remind and info.
However in case of Teletext Guide the broadcaster is responsible if these functions are possible.
You can search for the programmes you want to watch up to 7 days in advance. It is also possible to search for a programme by theme, e.g. sport, movie, etc. Once a programme has been selected it can be tagged, to remind you, or to record on the video recorder automatically (provided the video recorder is equipped with NEXTVIEWLink, level 2.0), once, daily, weekly or series. Teletext Guide/NEXTVIEW also allows direct access to detailed information about programmes if provided by the broadcaster.

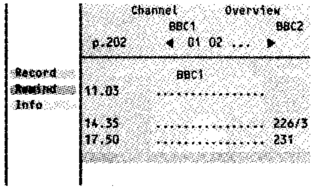
The broadcaster is responsible for the contents of the information.
The TV is responsible for the capture of that information and for the presentation to the user.



Use of the Teletext Guide/NEXTVIEW menus

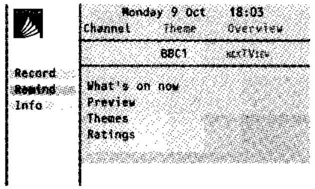
- ❶ Press the 📖 key on the remote control to display/cancel the Teletext Guide/NEXTVIEW menu.
- ❷ Use the cursor in the up/down, left/right directions to select the date, **CHANNEL** for the channel guide, **THEME** for the theme guide, **OVERVIEW** for an overview of all the programmes which are marked as reminders or for recording, the programme guide page number or to enter the programme list.

Teletext Guide

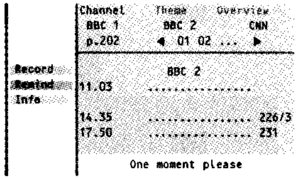

Channel Overview
BBC1 BBC2
p.202 ◀ 01 02 ... ▶
Record
Remind
Info
BBC1
11.03 ....
14.35 .... 226/3
17.50 231

- ❸ Enter the proper programme guide page number with the digit keys or with the – **P** + keys.
- ❹ Press the cursor left/right to run through the subpages.
- ❺ Select a programme with the cursor up/down.
- ❻ Press one of the colour keys to select one of the basic functions (if available); **record, remind, info.** See Basic functions further on.
- ❼ Press the **OK** key to return to the header area again.

NEXTVIEW


Monday 9 Oct 18:03
Channel Theme Overview
BBC1 NEXTVIEW
Record
Remind
Info
What's on now
Preview
Themes
Ratings

- ❸ Select a programme with the cursor up/down.
- ❹ Press one of the colour keys to select one of the basic functions (if available); **record, remind, info.** See Basic functions further on.
- ❺ Press the **OK** key to return to the header area again.


Channel Theme Overview
BBC 1 BBC 2 CNN
p.202 ◄ 01 02 ... ►
Record
Remind
Info
BBC 2
11.03 ....
14.35 .... 226/3
17.50 231
One moment please

Teletext guide

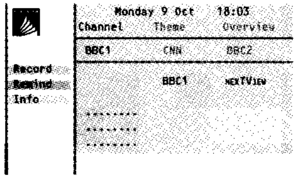
TV channels which broadcast teletext also transmit a page with the programme guide of the day. For each selected TV channel the programme guide page can be selected with the ⊟ key:

- automatically if the selected TV channel supports services like PDC (Programme Delivery Control) or MIP (Magazine Inventory Page).
- if automatic pre-selection is not possible then the index page is displayed and the proper programme guide page number of the selected TV channel has to be entered with the digit keys.

The programme guide page will be stored automatically only if it satisfies Video Programming via Teletext (VPT) requirements.

Every time you press the ⊟ key, the programme guide page of the selected TV channel will be available if the TV channel does not support NEXTVIEW.

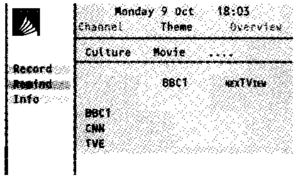
The function items record, remind and info, corresponding with the coloured keys, become highlighted if the displayed programme page satisfies the Video Programming via Teletext (VPT) requirements. Select a programme item and press one of the function keys, e.g. Record or Remind. See Basic functions further on.
The Info item is enabled if the selected programme contains a page number with an optional subcode referring to a page with more info about the programme.


Monday 9 Oct 18:03
Channel Theme Overview
BBC1 CNN BBC2
Record
Remind
Info
BBC1 NEXTVIEW
....
....
....

NEXTVIEW modes to sort and represent information

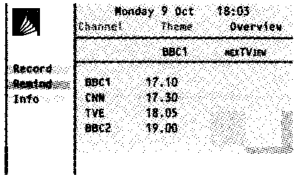
Channel

The Channel guide provides an overview of all programmes that are broadcast by a single channel during one day.
Already passed programmes can be made visible via cursor up.
The list will start with the earliest broadcast programme.
With cursor left/right another favourite TV channel can be selected.


Monday 9 Oct 18:03
Channel Theme Overview
Culture Movie ....
Record
Remind
Info
BBC1 NEXTVIEW
BBC1
CNN
TVE

Theme

The theme guide displays a list of all programmes at the selected date, that matches with the selected category (news, sport, culture, movies, ...).
The default starting item will be the current or next programme on the current TV channel.
The **THEME** selection is only present if programmes in the TV guide have defined themes.

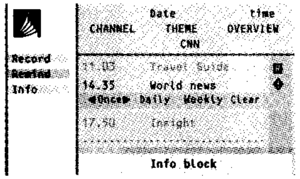

Monday 9 Oct 18:03
Channel Theme Overview
BBC1 NEXTVIEW
Record
Remind
Info
BBC1 17.10
CNN 17.30
TVE 18.05
BBC2 19.00

Overview

The Overview menu provides a list of programmes that are marked as reminders or to be recorded each day.
When more than one programme to be recorded has an overlap in time, these programmes will be marked by a red colour.

After the programme has been broadcast, all items set for once will be deleted from the list the following day. This menu can be used to change a reminder or recorder.

Note: the TV will automatically interpret the broadcast time (as shown on the teletext guide) of your selected programme into the correct local time and date.


Date time
CHANNEL THEME OVERVIEW
CNN
Record
Remind
Info
11.03 Travel Guide R
14.35 World news ◆
◄Once► Daily Weekly Clear
17.50 Insight
Info block

Basic functions

The functions Record, Remind and Info can be activated with the corresponding colour keys on the remote control.
If the function is not available, then the text is shown at reduced brightness.
Select a programme with the cursor up/down.

Record R or Remind ◆

❶ Press the red colour key to activate **Record** or the green colour key to activate **Remind.**
If the programme number of the broadcaster is not yet known, a message appears with the request to input the correct programme number with the cursor left/right and press OK.
A small menu pops up in which you can choose the interval: once, daily or weekly, or clear an earlier made record or remind setting. The default interval is set to **Once**. If a programme is an episode of a series, it is identified by the system and the options **daily** and **weekly** are replaced by the option **series**. In this case the system identifies when the next episode of the series will be broadcast. This is not possible in the Teletext guide.

❷ Use the cursor in the left/right directions to select the interval.
The colour of the tag refers to the interval.

❸ Press the **OK** key.

When **Record** R is activated:
Storing is displayed to indicate the video recorder is programmed.
When **Remind** ◆ is activated:
- a message will be displayed the moment the tagged programme with ◆ starts, when watching the TV later on.
- the TV switches on the moment the tagged programme with ◆ starts, when the TV is in standby.

Note: Recordings and reminders are not possible when the broadcaster does not transmit dates and times of the programmes.
*The message **No TV programming possible** appears.*
Make sure you are on the TV programming page.

Info

❶ Press the yellow colour key to activate **Info.**
Advertisements or information relating to the selected programme are displayed. In some cases all of the information does not fit on the screen. Use the cursor up/down to browse through all the information.

❷ Press the yellow colour key again to switch off the information.

Acquisition and updating of NEXTVIEW information

Acquisition and updating of NEXTVIEW is done when you are watching a TV channel supporting NEXTVIEW.

Video recorder restrictions with NEXTVIEW

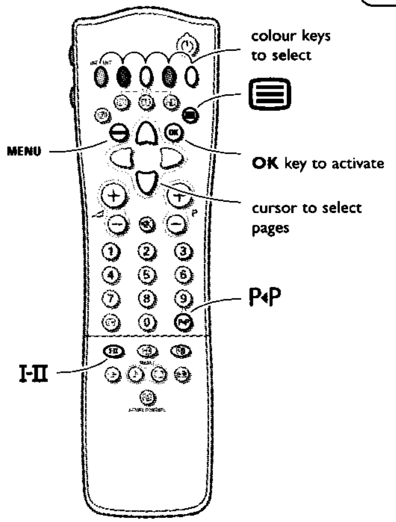
The **Record** item and the automatic recording will only be present and possible if your video recorder is equipped with NEXTVIEWLink.
Your video recorder should be connected to **EXTERNAL 2**. See Connect Peripheral Equipment, p. 19.

The daily, weekly and series options, the number of recordings set and the way overlapping recordings are managed, depend on the type of video recorder you have. When all video recorder timers are full, the item **Record** in the menu will not be present.

Upload video recorder overview *(only with Philips sets)*
When the TV is switched on, the timer recordings are uploaded to the TV to check if any manual addition or deletions have been done. This is shown in the overview.
The video recorder manages and removes timer recordings when performed.

Some NEXTVIEWLink video recorders do not allow a daily programming of the recording to start on a Saturday or Sunday. In this case the item **daily** will be removed from the menu on those days.

Teletext



Most TV channels broadcast information via teletext.
Each channel which broadcasts teletext transmits a page with information on how to use its teletext system. Look for the teletext page with the main index (usually p. 100).
Depending on the TV channel, teletext is transmitted in different systems.
The colours used in the options line correspond with the colour keys of your remote control.

About Easy Text

Easy Text considerably reduces the waiting time (on condition that the teletext broadcast of the particular TV channel is received for at least half a minute) by :

- a direct selection of previous and following pages which are in transmission and of the pages referred to in the options line
- a habit watcher list: frequently used pages are put automatically in a list of preferred pages, so that they are immediately available
- the precapturing of the page numbers referred to in the displayed page
- the precapturing of all the subpages.

Switch Teletext on and off

Press ▤ to switch the teletext on or off.
The main index page appears on the screen together with two information lines at the top and one option line at the bottom of the screen.

Remark: if the displayed teletext characters on screen do not correspond with the characters used in your language, press the **I-II** *key repeatedly to select Language group 1 or 2.*

Select a Teletext page

With the digit keys
Enter the desired page number with the digit keys.
The page counter seeks the page or the page appears immediately when the page number has been stored in the memory.
A message appears when you have entered a non existent or incorrect page number. Page numbers beginning with 0 or 9 do not exist. Choose another number.

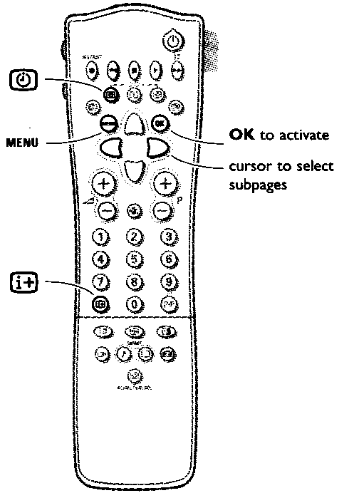
With the option line
Select with the colour keys, corresponding to the coloured options at the bottom of the screen, the desired subject.

Quickly run through the teletext pages

Press the cursor up/down or the **- P +** key to run through the previous or the following pages.

Select the previously selected txt page

Press the P‹P key.



Select the index teletext page

Press the white colour key to display the main index (usually p.100).

Only for T.O.P teletext broadcasts :
T.O.P orders the pages in categories and adds other possibilities of enhancing ease of use.
Press i+. A T.O.P. overview of the teletext subjects available is displayed.
Not all TV channels broadcast T.O.P. teletext. When the teletext system is not T.O.P. teletext, a message appears at the top of the screen.
Select with the cursor up/down, left/right the desired subject and press the **OK** key.

Select subpages

When a selected teletext page consists of different subpages, one of the subpages appears on the screen.
The coloured number in the first information line refers to the displayed subpage.
The other subpages can be selected in 2 ways :

With the cursor left/right
The other subpage numbers appear in white as soon as the transmission has found them. They are stored in the memory so that they are available while the teletext page is on screen.
Select with the cursor left/right the previous or the following subpage.

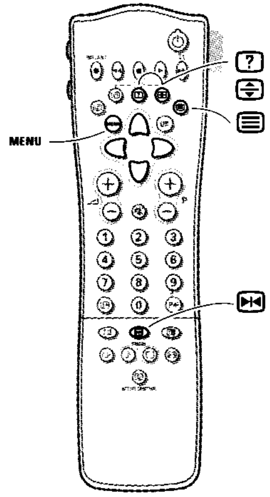
With the ◎ key
- Enter the subpage number yourself:

Press ◎. Enter the desired subpage with the digit keys : e.g. 3 for the third page of seven subpages.
The TV searches for the selected subpage.

- Automatically rotating subpages:

Press ◎ again to cancel the entered digit key for the subpage.
Now the subpages rotate automatically.

Press ◎ again to select the subpages with the cursor left/right again.



Special teletext functions

Hold
Press ⧓ to stop the automatically rotating of the subpages or to stop the page counter from seeking when you have entered a wrong page number or when the page is not available.
Enter another page number.

Enlarge
Press ⇕ repeatedly to display the upper part, the lower part and then to return to the normal page size. When the upper part is displayed, you can scroll the text, line by line using the cursor up/down.

Reveal
Press ? to reveal/conceal the hidden information, such as solutions to riddles and puzzles.

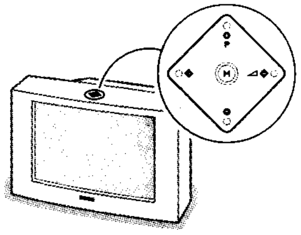
Select Continuous Subtitles

TV channels with teletext often transmit programmes with subtitling. For each TV channel you can store a subtitle page which will be displayed continuously if the programme being broadcast is transmitted with subtitles.

Switch on teletext and select the proper subtitle page from the index.
Switch off teletext.
Now the subtitle page is stored for the selected TV channel.

Once subtitles have been stored and **Subtitle On** has been selected they will automatically be displayed on the selected TV channel if subtitles are in the transmission.
Select **Subtitle On** or **Off** in the Features menu, see p. 11.
The subtitle symbol ⊟ appears when **Subtitle On** is selected.

Remark: you are in teletext mode, so only teletext functions are available.



Keys on top of the TV

Should your remote control be lost or broken you can still change some of the basic picture settings with the keys on top of the TV.

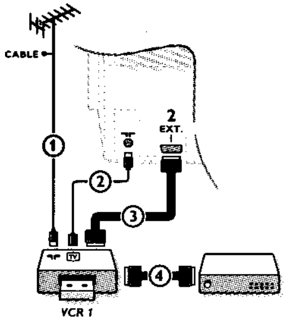
Press the **M** key repeatedly to select **Volume**, **Brightness**, **Colour**, **Contrast**.
Press the **P** - or + keys to carry out the selected adjustment.
When the menu adjustment is not displayed, the **P**- or + keys enable you to select the TV channels, the ◿ - or + keys to adjust the volume.

The selected adjustment automatically switches off when no action has been executed for 10 seconds.

Connect Peripheral Equipment

There is a wide range of audio and video equipment that can be connected to your TV. The following connection diagrams show you how to connect them.

Video recorder



Connect the aerial cables ①, ② and, to obtain the optimum picture quality, eurocable ③ as shown opposite.

If your video recorder is provided with the EasyLink function, the eurocable supplied with it should be connected to **EXTERNAL 2** *to benefit from the EasyLink functionality.*

If the eurocable ③ is not used the following steps are required:

Search for and store the test signal of the video recorder

❶ Unplug the aerial cable ① from the aerial socket ⊤ of your video recorder.

❷ Switch on your TV and put the video recorder on the test signal. (See the handbook for your video recorder.)

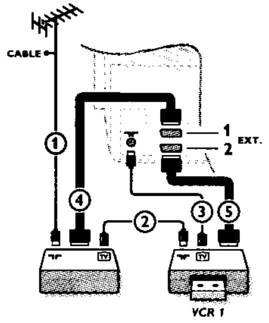
❸ Search for the test signal of your video recorder in the same way as you searched for and stored the TV signals. See Installation, Searching for and storing TV channels, Manual installation, p. 5.

❹ Store the test signal under programme number 0 or between 90 and 99.

❺ Replace the aerial cable in the aerial socket ⊤ of your video recorder after you have stored the test signal.

Decoder and video recorder
Connect a eurocable ④ to your decoder and to the special euroconnector of your video recorder. See also the video recorder handbook.
See Define Decoder/Descrambler prog. numbers, p. 7.
You can also connect your decoder directly to **EXTERNAL 1** or **2** with a eurocable.

Video recorder and other peripherals (except Digital Sources)



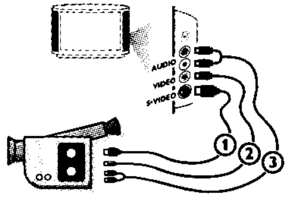
❶ Connect the aerial cables ①, ② and ③ as shown opposite. Better picture quality can be obtained if you also connect eurocable ⑤ to **EXTERNAL 2** and a eurocable ④ to **EXTERNAL 1**.

❷ Look for the test signal of your peripheral in the same way as you do for a video recorder.

When a video recorder is connected to **EXTERNAL 1** *you can only record a programme from your TV.*
Only when a video recorder is connected to **EXTERNAL 2** *it is possible to record a programme from your TV as well as from other connected equipment. See Record with your video recorder, p. 24.*

Note: EXTERNAL 1 can handle CVBS and RGB, EXTERNAL 2 CVBS and Y/C.

Camera & camcorder



❶ Connect your camera or camcorder to sockets at the right side of your TV.

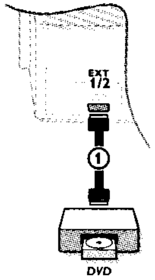
❷ Connect the equipment to **VIDEO** ② and **AUDIO L** ③ for mono equipment.

Press the I-II key repeatedly to select the sound coming from one or both loudspeakers of your TV.

❸ For stereo equipment also connect **AUDIO R** ③.

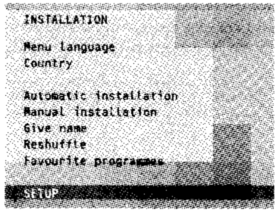
S-VHS quality with an S-VHS camcorder is obtained by connecting the S-VHS cables with the **S-VIDEO** input ① and **AUDIO** inputs ③.

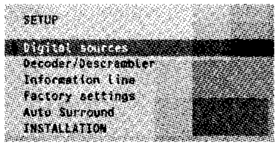
Digital equipment (DVD, digital satellite tuner,...)



Connect your digital equipment with a eurocable ① to one of the euroconnectors (**EXT1** or **EXT2**), or with a cinch cable to the **VIDEO** input at the right side of the TV (see illustration above).

❶ Press ⊚ and ⊕ at the same time.

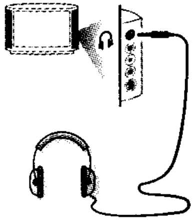




❷ Select **Digital sources** in the Setup menu of the **INSTALLATION** menu and select:
- **None** if you have no digital source connected,
- **EXT1** or **EXT2** if you have connected your equipment to a euroconnector,
- **FRONT** in case you have connected your equipment to the right side of the TV.

❸ Press the **MENU** key to switch off all menus.

Note: the low quality of some digital picture material may be the cause of digital image distortion. In this case select **Eco** *under the* **SMART PICTURE** ☐ *key on the remote control as this setting is intended to improve distorted picture quality.*

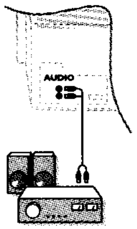


Headphone

❶ Insert the plug into the headphone socket 🎧 at the right side of the TV.

❷ Press 🔇 on the remote control to switch off the internal loudspeakers of the TV.
The headphone impedance must be between 8 and 4000 Ohm.
The headphone socket has a 3.5 mm jack.

In the **SOUND** menu select **Headphone volume** to adjust the headphone volume, see p. 10.



Audio equipment / Amplifier

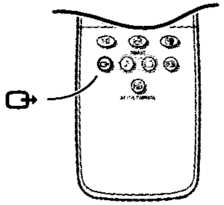
Connect the audio cables to the audio input of your audio equipment and to **AUDIO L** and **R** at the back of your TV.

You can listen to your TV sound via your audio equipment.

If you want to connect more equipment to your TV, consult your dealer.

To select connected equipment

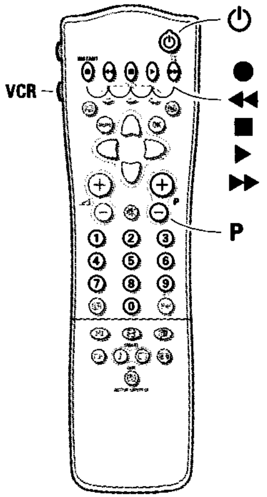
If the TV is connected to a video recorder with the EasyLink function, in some cases the TV will be switched on, even when it was in standby. (E.g. playback tape,...)
This is not possible when Child lock On is selected.



Equipment connected with an aerial cable only :
Select the programme number under which you have stored the test signal with the digit keys.

Equipment connected to a euroconnector or to the right side of the TV
Press the ⊡ key repeatedly to select **EXT1**, **EXT2** or **FRONT**, according to where you connected your equipment at the back or the right side of your TV.
Remark : Most equipment (decoder, video recorder, satellite receiver) carries out the switching itself.

If you want to change to TV channels?
Enter the programme number of the TV channel which you want to watch with the digit keys or press the ⊡ key repeatedly to select **TV**.



Audio and video equipment keys

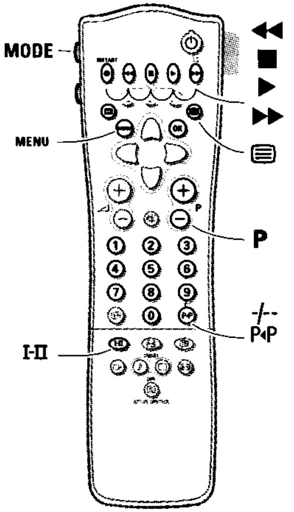
Most of the audio and video equipment from our range of products can be operated with the remote control of your TV.

Video recorder
Keep the **VCR** key on the left side of the remote control pressed and simultaneously press:

●	for record,
◀◀	for rewind,
■	for stop,
▶	for play,
▶▶	for fast forward,
-/--	for selecting 1- or 2-digit programme numbers from the video recorder,
- P +	for sequential programme selection from the video recorder tuner,
0 to 9	to select a programme number from your video recorder tuner,
⏻	to switch the video recorder to standby

These keys function with equipment which use the RC5 signalling standard.

If your video recorder has the EasyLink function, the key **INSTANT** ● *for recording, can be operated in the TV mode.*
If your EasyLink video recorder has the system standby function, when you press the ⏻ *key for 3 seconds, both TV and the video recorder are switched to standby.*



Satellite receiver

Press the **OK** key simultaneously with the digit key 1.
Now you can operate your satellite receiver with the remote control of your TV.

Keep the **MODE** key on the left side of the remote control pressed and simultaneously press:

MENU	to switch the **SAT** menu on or off
-/--	to select a one or two digit programme number from the satellite receiver.

These keys function with equipment which use the RC5 signalling standard.

DVD player

Press the **OK** simultaneously with the digit key 2.
Now you can operate your DVD player with the remote control of your TV.

Keep the **MODE key** on the left side of the remote control pressed and simultaneously press:

MENU	to switch the DVD menu on or off
▤	to select a DVD title
P◂P	to select a DVD chapter
I-II	to select your choice of audio language
◂◂	to search down
■	stop
▶	play
▶▶	to search forward
0-9	to select a programme number from your DVD
OK	to enter the selected menu item

●, ⏻, ⓘ, ⊕, ⇨ have no function

Note: after replacing the batteries the default operational equipment is the satellite receiver.

These keys function with equipment which use the RC6 signalling standard.

Record with your video recorder

To record S-VHS quality, connect an S-VHS peripheral directly to the video recorder.

Record a TV programme

❶ Select the programme number on your video recorder.
❷ Set your video recorder to record.
See the handbook for your video recorder.

Switching programme numbers on your TV does not disturb recording !

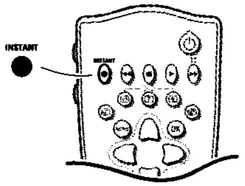
Record a programme on your video recorder connected to EXTERNAL 2 from Audio/Video equipment connected to EXTERNAL 1 or to sockets on the right side of the TV

❶ Switch on the equipment.
❷ Select the right external on your video recorder.
❸ Set your video recorder to record.
You record what you are watching on the screen.

Do not switch programme numbers or do not switch off your TV when you are recording !

Record with your video recorder with EasyLink

If you have connected an S-VHS video recorder provided with the EasyLink function, you can record S-VHS-quality from an S-VHS peripheral connected to the right side of the TV. (E.g. from an S-VHS camcorder.)



In TV mode, it is possible to start a direct recording of the programme which is being displayed on the TV screen.
Press the **INSTANT** ● *record key of the remote control.*
The video recorder switches on from standby and a message of what is being recorded appears on the screen.
The video recorder starts recording the programme you are watching.
Switching programme numbers on your TV does not disturb recording !

When recording a programme from a peripheral connected to EXTERNAL 1 or FRONT, you can not select another TV programme on the screen.
To watch TV programmes again, press the programme number you want to select twice.
Attention: the recording is stopped and your video recorder switches to standby.

Record with your video recorder with NEXTVIEWLink

If your video recorder is equipped with NEXTVIEWLink, and you tagged one or more programmes to be recorded automatically in the NEXTVIEW mode, it is not necessary for the TV to be in the standby mode or switched on for the recording to start.

4. Mechanical instructions

4.1 Accessing the service connector (for ComPair)

1. Remove the 'Service Connector' cover, see Figure 4.1.
2. Connect the ComPair cable (for more info see chapter 5).
3. Start ComPair and perform the diagnosis.

4.2 Removing the Rear Cover

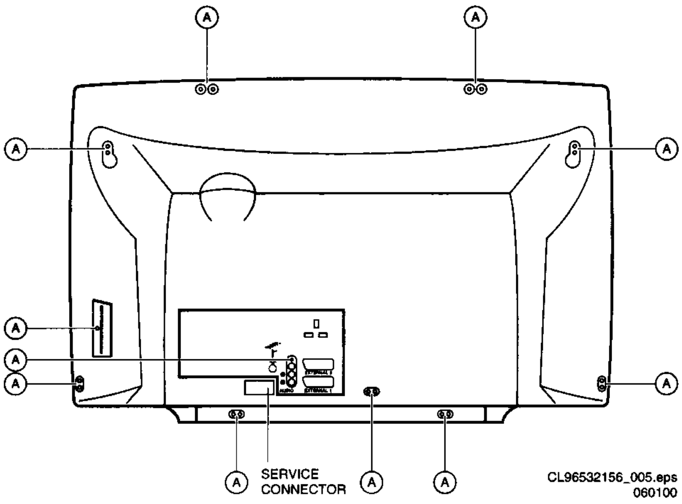

A
SERVICE CONNECTOR
CL96532156_005.eps
060100

Figure 4-1

1. Remove the fixation screws (A) of the rear cover, notice also the screw for the side-I/O.
2. Now the rear cover can be removed.

4.3 Service position

The following PWB's are present in this chassis (see also 'Chassis overview', chapter 1):

1. Large Signal Panel (LSP)
2. Small Signal Board (SSB)
3. Top Control panel
4. CRT panel (or PTP)
5. Side I/O panel
6. Mains Switch/LED panel

4.3.1 Service position LSP

Position 1: For better accessibility of the LSP, do the following (figure 4.2):

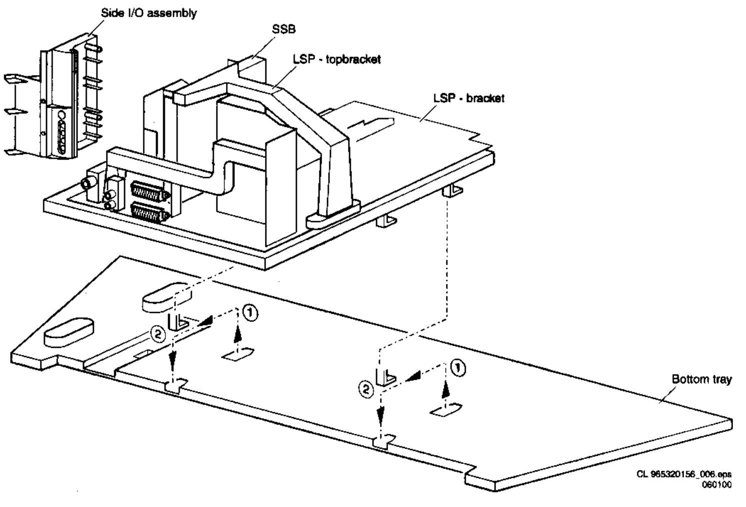

Side I/O assembly
SSB
LSP - topbracket
LSP - bracket
①
②
①
②
Bottom tray
CL 965320156_006.eps
060100

Figure 4-2

1. Remove the LSP-bracket from the bottom tray by pulling it backwards.
2. Hook the bracket in the first row of fixation holes of the bottom tray. In other words reposition the bracket from (1) to (2).

Position 2: To get access to the bottom side (solder side) of the LSP, do the following (figure 4.3):

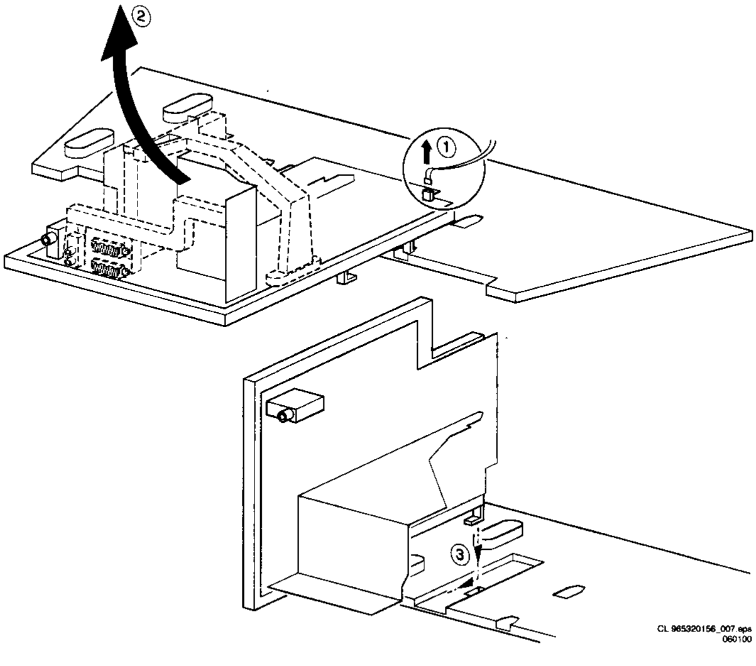

②
①
③
CL 965320156_007.eps
060100

Figure 4-3

1. Disconnect the degaussing coil from the LSP by removing the cable on connector 0020 (1).
2. Release the wiring from the heatsink fixation clamps, in order to get room for repositioning the LSP.
3. Turn the LSP 90 degrees clockwise (2) and place it in the fixation hole at the left side of the bottom tray (3).

4.3.2 Service position SSB

In fact there is no predefined service position for the bottom (B-) side of the SSB. All relevant test points are located on the A-side (side that is facing the Tuner).
If IC's must be replaced: take the complete panel out of the SIMM-connector.
To get access to the SSB test points, do the following:

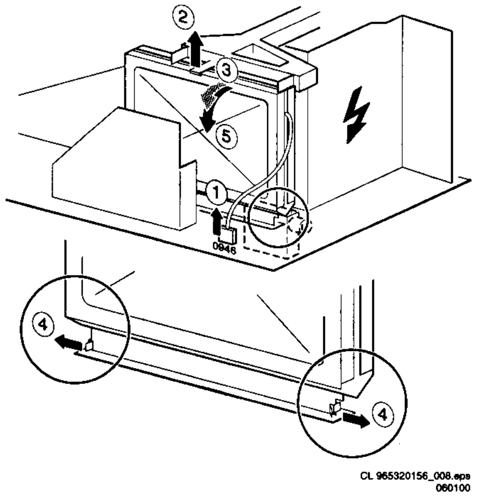

②
③
⑤
①
0946
④
④
CL 965320156_008.eps
060100

Figure 4-4

1. Put the LSP in service position 1 (as described above).
2. Disconnect the IF-cable from connector 0946 (1).
3. Release the 'top fixation clamp' which holds the SSB (2) and pull the SSB slightly towards the Tuner (3). At the same time, the 2 metal clamps at both sides of the SIMM-connector must be released (4) and the complete SSB can be taken out now by pulling the top-side of the SSB towards the Tuner (5). It 'hinges' in the SIM-connector.

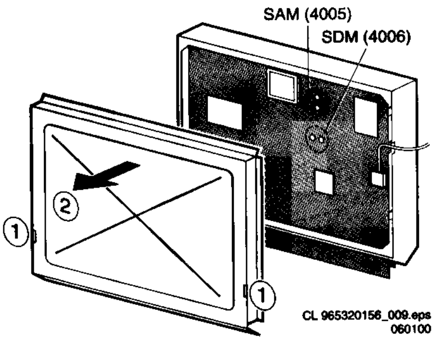


Figure 4-5

1. Once the SSB has been taken out of the connector, the A-side shielding can be removed.
2. After removal of the shielding, the panel can be replaced in its connector in reverse order. Don't forget to reconnect the IF-cable.
3. If necessary for the measurement, the LSP can be put in 'service position 2' (as described above).

4.3.3 Accessing the Top Control panel

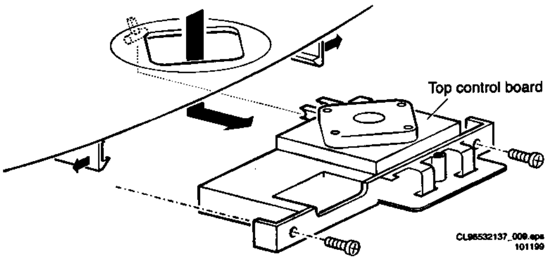


Figure 4-6

1. Remove the two screws.
2. Pull the board backward.

4.3.4 Accessing the Side I/O panel

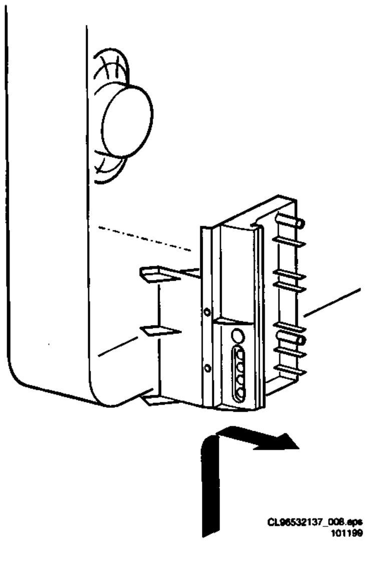


Figure 4-7

1. The complete Side I/O-assembly can be lifted out of the hinge for servicing.
2. The board can easily be removed out of the bracket by releasing the fixation clamps.

4.3.5 Accessing the Mains Switch/LED panel

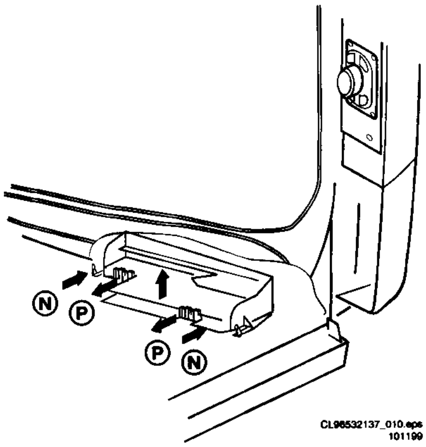


Figure 4-8

1. Release the two fixation clamps (N) by pushing them upward.
2. At the same time, the complete assy must be pulled backward (P).
3. If necessary, the light guide can be replaced now.
4. The 'Mains Switch/LED'-panel can be removed now by releasing the clamps of the bracket.

4.4 Mounting the Rear Cover

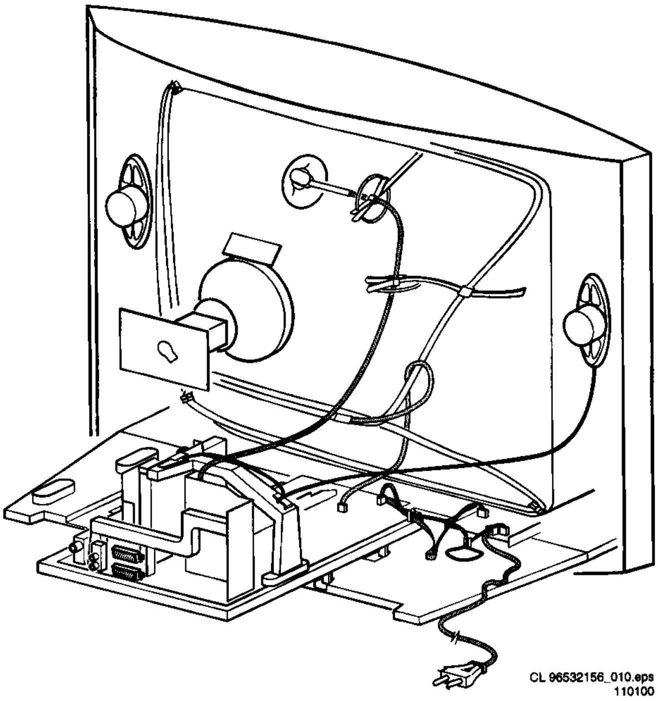


Figure 4-9

Before mounting the Rear Cover, some checks has to be performed:

- Check whether the Mains Cord is mounted correctly in the guiding brackets.
- Check whether all cables are replaced in their original position. This is very important due to the large 'hot' area of the set. Special attention must be paid to the right Loudspeaker cable and the degaussing cable.

5. Service modes, error codes, protections, faultfinding and repair tips

In this chapter the following paragraphs are included:

1. Test points.
2. Service modes.
3. Problems and solving tips (related to CSM).
4. ComPair.
5. Error codes.
6. Protections.
7. Repair tips.

5.1 Test points

The EM2E chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

- P1-P2-P3, etc. on LSP: Test points for the power supply.
- L1-L2-L3, etc. on LSP: Test points for the line drive and line output circuitry.
- F1-F2-F3, etc. on LSP: Test points for the frame output circuitry.
- R1-R2 on LSP: Test points for the rotation circuitry.
- A1-A2-A3, etc.: Test points for the audio circuitry.
- I1-I2-I3, etc. on SSB:Test points for the Tuner/IF part.
- S1-S2-S3, etc. on SSB: Test points for the synchronisation circuitry.
- V1-V2-V3, etc. on SSB: Test points for the video processing circuitry.
- C1-C2-C3, etc. on SSB: Test points for the control and teletext circuitry.
- F1F-F2F-F3F, etc.: Test points for the CRT-panel circuitry.
- SC1-SC2-SC3, etc: Test points for the SCAVEM circuitry.

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block in the sequence of the relevant test points for that functional block.

5.2 Service modes and ComPair

5.2.1 Service Default Mode (SDM)

The purpose of the SDM is to provide a situation with predefined settings to get the same measurement results as given in this manual.

Specification of the SDM:

- Tuning frequency 475.25 MHz.
- TV-system for BGLM sets set to BG.
- All picture settings at 50 % (brightness, colour, contrast, hue).
- All sound settings at 50 % except volume at 25 % (so bass, treble, balance at 50 %, volume at 25 %).
- All service-unfriendly modes are disabled (like sleep timer, child lock, blue mute, AVL and SDLP).

Entering the SDM can be done in 4 ways:

- Via a standard RC-handset by entering the code '062596' followed by the 'MENU' button (it is possible that, together with the SDM, the main menu will appear. To switch it off, push the 'MENU' button again).
- Via ComPair.
- By the 'DEFAULT' button on the DST while the set is in the normal operation mode.
- By short-circuiting for a moment the two solder-pads with the indication 'SDM' (item 4006) on the A-side of the SSB (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SDM is entered via the pins, all the software-controlled protections are de-activated.

Exiting the SDM can only be done via the STANDBY command. By switching off-on the set with the mains switch the set will come up again in the SDM.

5.2.2 Service Alignment Mode (SAM)

The purpose of the SAM is to align the set and/or adjust the settings.

Specification of the SAM:

- Software alignments (see chapter 8).
- Option settings (see chapter 8).
- Error buffer reading and erasing. The most recent error code is displayed on the left side.
- Operation counter.
- Software version.

Entering the SAM can be done in 4 ways:

- Via a standard RC-handset by entering the code '062596' followed by the 'OSD' button [i +] (it is possible that, due to the button sequence, the channel will change to channel 9. To return to the channel of your selection, push the appropriate button on the RC).
- Via ComPair.
- By the 'ALIGN' button on the DST while the set is in the normal operation mode (or SDM). Enter the password '3140' and press OK.
- By short-circuiting for a moment the two solder-pads with the indication 'SAM' (item 4005) on the A-side of the SSB (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SAM is entered via the pins, all the software controlled protections are de-activated.

The Service Alignment Mode menu will now appear on the screen. The following information is displayed:

- Date: the software date.
- ID: the software version of the ROM (Example: EM2E11.0_01501. This software-code stands for EM2E (chassis), E = Europe, 1 = language, 1.0 = software version, xxxxx = latest 5 digits of 12nc code software).
- Operation Hours: the accumulated total of operation hours.
- Errors: followed by maximal 10 errors. The most recent error is displayed at the upper left. For explanation errors see (table 5.1).
- Defect. Module: here the module that generates the error is displayed. If there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. The message 'Unknown' will then be displayed here.
- Reset Error Buffer: pressing the 'OK' key can reset the error buffer.
- Functional Test: all devices are tested via the 'OK' key. Eventual errors are displayed in the error buffer. The error buffer is not erased, the content returns when the Functional Test is terminated.
- Alignments: this enables the Alignments sub-menu to be called up.
- Dealer Options: extra features for dealers.

Exiting the SAM can be done via the 'MENU' command or via switching OFF-ON the set with the mains switch.

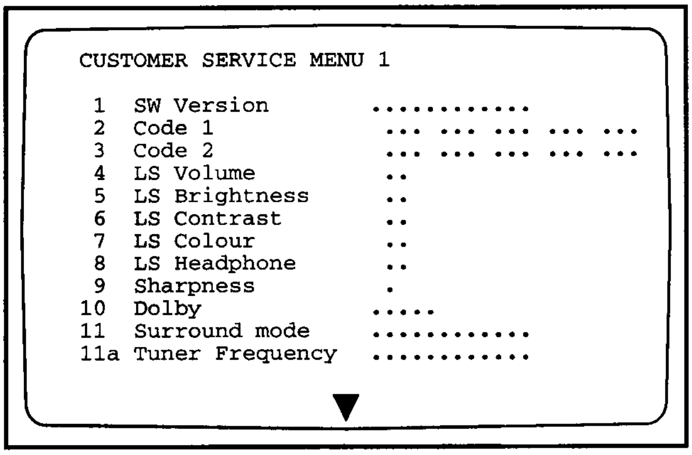
5.2.3 Customer Service Mode (CSM)

All EM2E sets are equipped with the 'Customer Service Mode' (CSM). This 'Customer Service Mode' is a special service mode, which can be activated and deactivated by the customer upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.

Switching-on of the Customer Service Mode:
The Customer Service Mode will switch-on after pressing simultaneously the 'MUTE' knob on the remote control handset and the 'MENU' button on the TV for at least 4 seconds. This activation only works if there is no menu on the screen.

Switching-off the Customer Service Mode:
The Customer Service Mode will switch-off after pressing any key of the remote control handset (with exception of the 'cursor-up' and 'cursor-down' keys), or the buttons on the TV or by switching off the TV set with the mains switch.

Detailed explanation of the Customer Service Mode
After switching on the Customer Service Menu the following screen will appear:



```
CUSTOMER SERVICE MENU 1

 1  SW Version        ............
 2  Code 1              ... ... ... ... ...
 3  Code 2              ... ... ... ... ...
 4  LS Volume         ..
 5  LS Brightness     ..
 6  LS Contrast       ..
 7  LS Colour         ..
 8  LS Headphone      ..
 9  Sharpness         .
10  Dolby             .....
11  Surround mode     ............
11a Tuner Frequency   ............
```

CL96532137_024.eps
101199

Figure 5-1

Note: Following text is an explanation of the CSM. Be aware that these descriptions are depending on the set hardware.

Line 1:
Software version; the build in software version (AAABCX.Y)

- AAA = chassis name (EM1 = Painter processor, EM2 = OTC processor)
- B = country (E = Europe, A = Asian Pacific, U = USA)
- C = 1 (language cluster)
- X = main version number
- Y = sub version number

Details on the software version can be found in the chapter 'Software Survey' of the publication 'Product Survey - Colour Television'.

Line 2:
Code 1; gives the last 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted.

Line 3:
Code 2; gives the first 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted.
The last occurred error is displayed on the leftmost position of code 2. Each error code is displayed as a 3 digit number. When less than 10 errors occur, the rest of the line(s) is (are) empty. In case of no errors the text 'No Errors' is displayed. See paragraph 5.5 of this chapter for a description of the error codes.

Line 4:
LS Volume; gives the Last Status of the volume as set by the customer for this selected transmitter. The value can vary from 0 (volume is minimum) to 24 (volume is maximum). Volume values can be changed via the volume key on the remote control handset.

Line 5:
LS Brightness; gives the Last Status of the brightness as set by the customer for this selected transmitter. The value can vary from 0 (brightness is minimum) to 63 (brightness is maximum). Brightness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Brightness'.

Line 6:
LS Contrast; gives the Last Status of the contrast as set by the customer. The value can vary from 0 (contrast is minimum) to 63 (contrast is maximum). Contrast values can be changed via 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Contrast'.

Line 7:
LS Colour; gives the Last Status of the colour saturation, as set by the customer. The value can vary from 0 (colour is minimum) to 63 (colour is maximum). Colour values can be changed via 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Colour'.

Line 8:
LS Headphone; gives the Last Status of the headphone volume, as set by the customer. The value can vary from 0 (volume is minimum) to 24 (volume is maximum). Headphone volume values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'SOUND' and 'Headphone'.

Line 9:
Sharpness; gives the sharpness value. The value can vary from 0 (sharpness is minimum) to 7 (sharpness is maximum). In case of bad antenna signals a too high value of the sharpness can result in a noisy picture. Sharpness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'PICTURE' and 'Sharpness'.

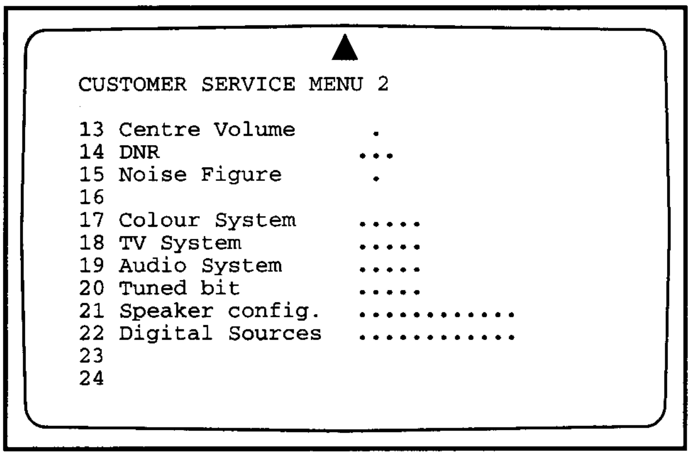
Line 10:
Dolby; indicates whether the received transmitter transmits Dolby sound (present) or not (not present). Attention: The presence of Dolby can only be tested by the software on the Dolby Signalling bit. If a Dolby transmission is therefore received without a Dolby Signalling bit, then this indicator will show 'not present' even though such a Dolby transmission is received.

Line 11:
Surround Mode; indicates the by the customer selected surround mode. In case the set is a Non-Dolby set there will be displayed '0'. If it is a Dolby-set then is displayed: 'Pro Logic', 'Dolby 3 Stereo', 'Hall' or 'Off'. For Dolby-set surround mode can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'SOUND' and 'Surround settings'.

Line 11a:
Tuner Frequency; indicates the frequency the selected transmitter is tuned to. The tuner frequency can be changed via the “cursor left” and “cursor right” keys for fine tune or by entering directly with the digit keys 0 to 9 on the remote control

handset after opening the installation menu and selecting "manual installation".
The installation menu can be opened by pressing "timer" and "enlarge" at the same time.

By means of the 'cursor-down' knob on the remote control handset the Customer Service Menu 2 will appear. By means of the 'cursor-up' knob on the remote control handset the Customer Service Menu 1 will appear again.
Customer Service Menu 2 represents following information:



```
                          ▲
CUSTOMER SERVICE MENU 2

13 Centre Volume       .
14 DNR                ...
15 Noise Figure        .
16
17 Colour System      .....
18 TV System          .....
19 Audio System       .....
20 Tuned bit          .....
21 Speaker config.    ............
22 Digital Sources    ............
23
24
```

CL96532156_036.eps
210100

Figure 5-2

Line 13:
Centre Volume; gives the volume value of the centre loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Centre volume can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'MENU' button and selecting 'SOUND', 'Dolby Pro Logic' and 'Centre volume'. This feature is only available when surround mode is in 'Dolby Pro Logic' or 'Dolby 3 Stereo'.

Line 14:
DNR; gives the setting of the DNR for the selected transmitter. The following selections are possible:
'off', 'min', 'med' or 'max'. The DNR is changed automatically when 'Active Control' is 'ON'.

Line 15:
Noise Figure; gives the noise ratio for the selected transmitter. This value can vary from 0 (good signal) to 127 (average signal) and to 255 (bad signal).

Line 16:
Digital Option; gives the selected digital mode, '100 Hz' or 'Digital Scan'. Digital option can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset, after pressing the "MENU' button and selecting 'PICTURE', 'Digital Options'.

Line 17:
Colour System; gives information about the colour system of the selected transmitter.
- Black and white: No colour carrier received
- PAL: PAL signal received
- SECAM: SECAM signal received
- NTSC: NTSC signal received

Line 18:
TV System; gives information about the video system of the selected transmitter.
- BG: BG signal received
- DK: DK signal received
- I: PAL I signal received
- L: SECAM L signals received
- M38.9: NTSC M signal received with video carrier on 38.9 MHz
- MN: NTSC M signal received

Line 19:
Audio System; gives information about the audio system of the selected transmitter.
- Sound Muted: No sound
- Dolby Pro Logic: Dolby Pro Logic sound received
- Mono: Mono sound received
- Stereo: Stereo sound received
- Dual I: Language I received
- Dual II: Language II received
- Digital Mono: Digital mono sound is received
- Digital Stereo: Digital stereo sound is received
- Digital Dual I: Digital language I is received
- Digital Dual II: Digital language II is received

Line 20:
Tuned bit; gives information about the tuning method of the stored pre-set. If the value is 'Yes' the pre-set is stored via manual entry of the frequency when a transmitter was not present on that frequency. In that case the TV will attempt to perform a micro-search every time the pre-set number is selected. Once the micro-search has been successful the Tuned Bit will be set to 'No'.

Line 21:
Speaker config.; gives the configuration setting for the speakers. In case the set is a Non-Dolby set there will be displayed '0'. If it is a Dolby-set then is displayed: 'Full internal', 'L/R external', 'Surround external' or 'Full external'. For the Dolby-set the speaker configuration can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting 'SETUP'. The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time. This feature is only available when the set has virtual Dolby.

Line 22:
Digital Sources; gives the configuration setting for the digital source. This can be 'FRONT', 'EXT1', 'EXT2' or 'None'. If one of these is selected the starting point is a top quality signal on that input and a number of settings are therefore changed automatically. The digital source can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting 'SETUP'. The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time.

5.3 Problems and solving tips

Below described problems are all related to TV-settings. The procedures to change the value or the status of the different settings are described in the paragraph 'Detailed explanation of the Customer Service Mode'.

5.3.1 Picture problems

Worse picture quality in case of DVD pictures
Check line 22 'Digital sources'. In case line 22 gives the indication 'Not Present' change the setting into 'Present'.

Snowy/noisy picture
1. Check line 15 'Noise Figure'. In case the value is 127 or higher and the value is also high on other programs check the aerial cable/aerial system.

2. Check lines 9 'Sharpness' and 15 'Noise Figure'. In case the value of line 9 is 3 or 4 and the value of line 15 is high (127 or higher), lower the value of line 9 'sharpness'.

Picture too dark
1. Press 'Smart Picture' button on the Remote Control handset. In case picture improves, raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 'LS Brightness' and 7 'LS Contrast'. The value of line 6 is low (<10) or the value of line 7 is low ((10). Raise the brightness value or raise the contrast value.

Picture too bright
1. Press 'Smart Picture' button on the Remote Control handset. In case picture improves, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 'LS Brightness' and 7 'LS Contrast'. The value of line 6 is high (>40) or the value of line 7 is high ((50). Reduce the brightness value or raise the contrast value.

White line around picture elements and text
1. Press 'Smart Picture' button on the Remote Control. In case picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
3. Check line 8 'Sharpness'. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.

No picture
Check line 20 'Tuned bit'. In case the value is 'Yes', install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation.

Blue picture
No proper signal is received. Check the aerial cable/aerial system.

Blue picture and/or unstable picture
A scrambled or decoded signal is received.

Black and white picture
Check line 5 'LS colour'. In case the value is low ((10) raise the value of colour. The new value(s) are automatically stored for all TV channels.

No colours/colour lines around picture elements
1. Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'PAL' and line 18 is 'M38.9', the installed system for this pre-set is 'USA', while 'West Europe' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.
2. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this pre-set is 'France', while 'West Europe' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.

No colours/noise in picture
1. Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'Black and White' and line 18 is 'BG', the installed system for this pre-set is 'West Europe', while 'USA' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'.
2. In case line 17 is 'Black and White' and line 18 is 'L', the installed system for this pre-set is 'France', while 'USA' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'

Colours not correct
Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this pre-set is 'France', while 'West Europe' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.

Colours not correct/unstable picture
Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'SECAM' and line 18 is 'BG', the installed system for this pre-set is 'USA', while 'France' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

Unstable picture
Check lines 17 'Colour System' and 18 'TV System'. In case line 17 is 'SECAM' and line 18 is 'M 38,9', the installed system for this pre-set is 'West Europe', while 'France' is required. Install the required program again: open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

Menu text not sharp enough
1. Press 'Smart Picture' button on the Remote Control handset. In case picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check line 7 'LS Contrast'. The value of line 7 is high (>50). Reduce the contrast value.

5.3.2 Sound problems

No sound from left and right speaker
1. Press 'Smart Sound' button on the Remote Control handset. In case sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Raise the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 'LS Volume'. The value is low. Raise the value of 'Volume'. The new value(s) are automatically stored for all TV channels.

Sound too loud for left and right speaker
1. Press 'Smart Sound' button on the Remote Control handset. In case sound improves, reduce the volume

value. The new value(s) are automatically stored for all TV channels.

2. After switching on the Customer Service Mode the volume is OK. Reduce the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 'LS Volume'. The value is high. Reduce the value of 'LS Volume'. The new value(s) are automatically stored for all TV channels.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the DST service remote control allowing faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding how to repair the EM2E in short time by guiding you step by step through the repair procedures.
- ComPair allows very detailed diagnostics (on I^2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I^2C commands yourself; ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the EM2E (when the micro processor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan EM2E electronic manual, schematics and PWB's are only a mouse-click away.

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable. In case of the EM2E chassis, the ComPair interface box and the television communicate with each other via a bi-directional service cable.

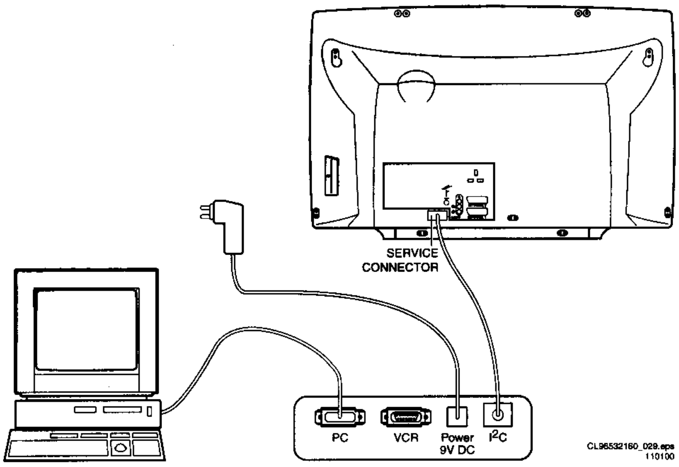


Figure 5-3

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in 2 ways:

1. Communication to the television (automatic)
2. Asking questions to you (manually)

ComPair combines this information with the repair information in its database to find out how to repair the EM2E.

Automatic information gathering

Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.

Diagnosis on I^2C level. ComPair can access the I^2C bus of the television without a physical connection. ComPair can send and receive infrared commands to the micro controller of the television. These commands are translated by the controller to I^2C commands and vice versa. In this way it is possible for ComPair to communicate (read and write) to devices on the I^2C busses of the EM2E.

Manual information gathering

Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an oscillogram) that will bring you to the next step in the faultfinding process.

A question could be: Does the screen give a picture? (Click on the correct answer) YES / NO

An example can be: Measure test point I7 and click on the correct oscillogram you see on the oscilloscope

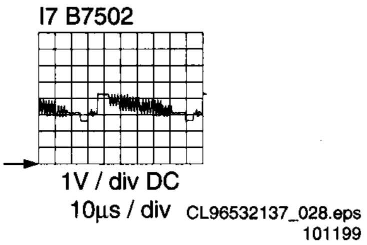


Figure 5-4

By a combination of automatic diagnostics and an interactive question/answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Additional features

Beside fault finding, ComPair provides some additional features like:

- Uploading/downloading of pre-sets
- Managing of pre-set lists
- Emulation of the Dealer Service Tool

5.4.2 SearchMan (electronic service manual)

When ComPair is installed in combination with SearchMan, all schematics and PWB's will be directly available while you repair a television if you click on a PWB or schematic link.

Example: Measure the DC voltage on C2568 (PWB/schematic) on the small signal level.

Clicking on PWB will automatically pop-up a picture of the PWB with the location of C2568 marked. Clicking on schematic will automatically pop-up the schematic with the location of C2568 marked.

5.4.3 Stepwise Start-up / Shutdown feature of set can be used via ComPair

Under normal circumstances, a fault in the power supply or an error during start-up will switch the television to protection-mode. ComPair can take over the initialisation of the television. In this way it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

Stepwise start-up explanation
Via ComPair the stepwise start-up can be realised. This is very helpful when a protection is activated (see also chapter 5.6).

State	Description mode	Display LED (Red)	Activate protection
0	Low Power Standby: 5V2/3V3 present, uP in Standby.	On	None
1	High Power Standby: TV-set in Standby.	Wait 1s, flash 1 time	None
2	Main Power On: 5V/8V present, HOP in Standby.	Wait 1s, flash 2 times	4, 5
3	HOP On: EHT startup, blackcurrent stabilisation off, picture blanked.	Wait 1s, flash 3 times	Plus 6, 2 & 1
4	Initialised. All IC's are initialised, blackcurrent stabilisation is on.	Wait 1s, flash 4 times	Plus rest
5	TV On: TV-set operates, unblanked picture.	Wait 1s, flash 5 times	

Stepwise shutdown explanation
In the stepwise shutdown mode, state 2 is skipped. (IC's can not be de-initialised).

State	Description mode	Display LED (Red)	De-activate protect.
5	TV On: TV-set operates, unblanked picture.	Wait 1s, flash 5 times	-
4	Initialised. All IC's stay initialised, blackcurrent stabilisation is on.	Wait 1s, flash 4 times	-
3	HOP On: EHT startup, blackcurrent stabilisation off, picture blanked.	Wait 1s, flash 3 time	6, 2, 1
1	High Power Standby: TV-set in Standby.	Wait 1s, flash 1 time	4, 5
0	Low Power Standby: 5V2/3V3 present, uP in Standby.	On	

Note: When set is in stepwise-mode and due to stepping-up a protection is activated, the set really will go into protection (blinking red led). The set will not leave the stepwise-mode however. By stepping up the set can be activated again, until state X, where protection was activated. At state (X-1) diagnostic measurements can be performed.

5.5 Error codes

5.5.1 Reading error codes from the error buffer

The error buffer can be read in 3 ways:

1. On the screen via the Service Alignment Mode (SAM). In case picture is OK, the error buffer can be read easiest via the SAM. In the main menu of the SAM the last 10 different error codes occurred are displayed. The most recent detected error code is displayed on the left side, so e.g.:
   - 0 0 0 0 0 means no error codes present in the buffer
   - 3 0 0 0 0 means one error code present in the buffer; error code 3
   - 2 3 0 0 0 means two error codes present in the buffer; error code 2 is the most recent, error code 3 is detected before 2.
2. Via the blinking LED procedure. The contents of the error buffer can also be made visible through the "blinking LED" procedure. This is especially useful when there is no picture. There are two methods:
   - When the SDM is entered, the LED will blink the number of times, equal to the value of the last (newest) error code (repeatedly).
   - Via the 'DIAGNOSE' key of the DST. If an error has been detected by the EM2E chassis, the set might go into protection. Without the presence of a picture, the errors can be displayed via the red LED on command of the DST, as long as the main-processor is still active. To display the errors via the red LED by the DST:
     1. Press the 'DIAGNOSE' key (in all modes except the SAM).
     2. Press '1' to view the last error detected (or '2', etc. to show the errors before).
     3. Press the 'OK' key. The blinking Red LED on the TV will now give the requested error.

     Example:
     Error code position 1 - 2 - 3 - 4 - 5
     Error buffer: 12 - 9 - 5 - 0 - 0

     After entering SDM: blink 1x long (750 ms for tens) - pause (1.5 s) - blink 8 x short (250 ms for units) - etc.
     After transmitting 'DIAGNOSE-2-OK' with the DST: blink 9 x short - pause (250 ms) - blink 9 x short - etc.
     After transmitting 'DIAGNOSE-3-OK' with the DST: blink 5 x short - pause (250 ms) - blink 5 x - etc.
     After transmitting 'DIAGNOSE-4-OK' with the DST: nothing happens
3. Via ComPair.

5.5.2 Clearing the error buffer

The error buffer can be cleared in 3 ways:

1. In the SAM by selecting the item 'RESET ERROR BUFFER' in the main menu.
2. By the 'DIAGNOSE 99' command of the DST (in all modes except the SAM). Press the DIAGNOSE key on the DST, followed by 9, 9 and then 'OK'.
3. Via ComPair.

Note: When error buffer is full (10 codes), no new error can be stored anymore. However of every error raised is monitored how long it exists in the error buffer. When for any reason a false raised error exists in the buffer, it will be deleted after 50 hours. If this error is still present after 50 hours, it will be raised again. In this way it is safeguarded that the error codes history is stored. Sometimes it is an option to first write down the error buffer content, reset the buffer, and look again which error codes are generated by the set.

5.5.3 Error code table

Error	Device	Description	Defective item	Diagram	Defect. module indication
1	ST24E32	NVM	7011	B5	Control
2	H fail protection	HFB			Horizontal Flyback
3	SAA4978	PICNIC	7709	B3	Feature Box
4	Supply 5 V	5V2			+5 V Supply
5	Supply 8 V	8V6			+8 V Supply
6	Slow I^2C-bus blocked				Slow I^2C blocked
7	TDA9330	HOP video control/geometry	7301	B4	Video Controller
8	TDA9320	HIP I/O-video processing	7323	B2	Chroma IF IO
9	X-ray protection			A3	
11	HOP protection				
12	Tuner protection	TUNER_PROT			+8 V (Tuner) Supply
13	UV1316	Tuner	U1200	A7	Tuner
14	MSP3451/3415	ITT sound processor + Dolby	7651	B6	Audio Module
15	Flash protection				
16	Featurebox protection	FBX_PROT			

Remark:If on the DST the text 'ERROR 2' is displayed, this means that the communication from the TV to the DST has failed.

5.6 Protections

5.6.1 General

The EM2E has only one micro-processor (OTC) which remains active during Standby. This because power of the microprocessor and the attached memory chip set is coming from the 3V3 supply, which is derived from the 5V Standby-circuitry. So in both Power-on as in Standby-mode the microprocessor is connected to this power supply.

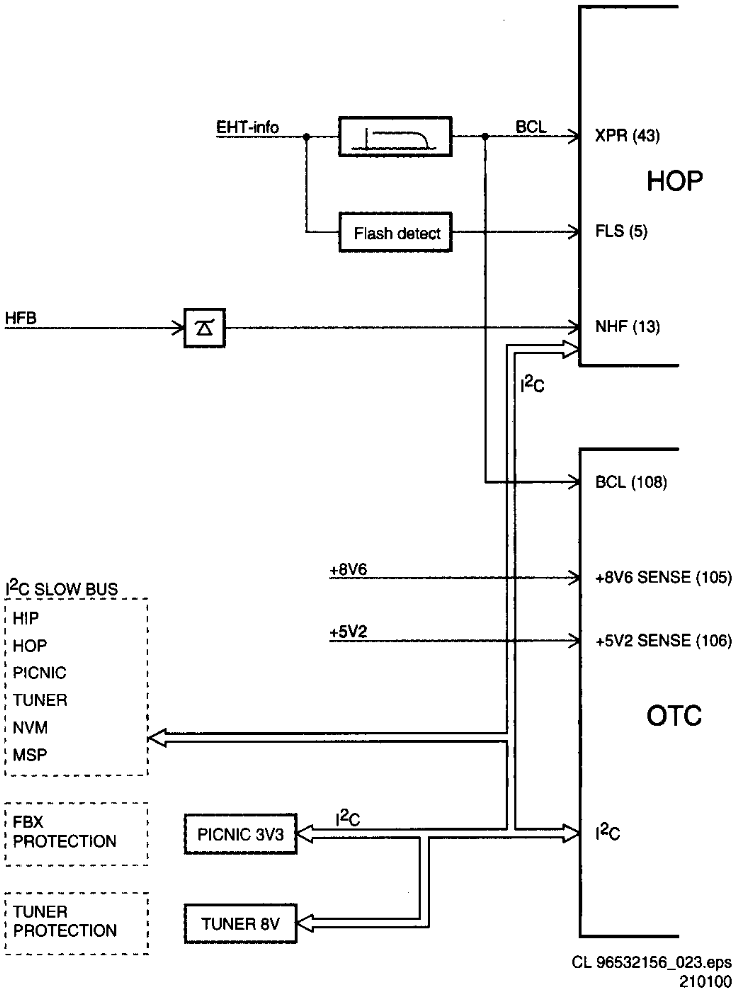
If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection-mode. The protection-mode is indicated by blinking of the red LED at a frequency of 3 Hz. In some error cases the micro processor does not put the set in the protection-mode. The error codes of the error buffer can be read via the service-menu (SAM), the blinking LED procedure or via DST/ComPair. The DST diagnose functionality will force the set into the Service-standby, which is alike the usual Standby, however the micro-processor has to remain in normal operation completely.

To get a quick diagnosis the EM2E has 3 service-modes implemented:

- The Customer Service Mode (CSM).
- The Service Default Mode (SDM). Start-up of the set in a predefined way.
- The Service Alignment Mode (SAM). In this mode items of the set can be adjusted via a menu and with the help of test patterns.

Both SDM & SAM modes can be entered via the 'service pads' on the SSB, via a RC (DST or standard RC) or via ComPair. The SAM can not be entered in Standby, the set has to be in normal operation.

The EM2E 'Protection Diagram' shows the structure of the protection system. See diagram below.



CL 96532156_023.eps
210100

Figure 5-5

There are several types of protections:

- I^2C related protections
- OTC related protections (via polling on I/O pins or via algorithms).
- HOP related protections (mainly for deflection items).
- Hardware errors which are not sensed by the OTC (e.g. BRIDGE_PROT)

I^2C related protections

In normal operation some registers of the I^2C controlled IC's will be refreshed every 200 msec. During this sequence the I^2C-busses and the I^2C -IC's as well will be checked. The I^2C

protection will take place if the SDA and SCL are whether short circuited to ground or to each other. An I^2C error can also occur, if the power supply of the IC is missing (e.g. TUNER_PROT (error 12) & FBX_PROT (error 16)).

OTC related protections

If a protection is detected at an input of the OTC, all protection inputs of the OTC will be scanned every 200 msec. for 5 times. If the protection on one of the inputs is still activated after 1 sec., then the set will be put in the protection-mode. Before the scanning is started a so-called ESD-refresh will be carried out first, because the interrupt on one of the inputs may be caused either by a FLASH or by ESD. As a FLASH or ESD can harm the settings of some IC's, the HOP-HIP-MSP-PICNIC-NVM and Tuner are initialised again to ensure the normal picture and sound conditions of the set.

- 8.6 V and 5.2 V protection. The presence of the 8.6 V and 5.2 V is sensed by the OTC. If these voltages are not present, then an error code is stored in the error buffer of the NVM, and the set is put in the protection-mode.

HOP related protections

Every 200 msec. the status register of the HOP is read by the OTC via I^2C. If a protection signal is detected on one of the inputs of the HOP, then the relevant error bit in the HOP register is set to 'high'. If the error bit is still 'high' after 1 sec., the OTC will store the error code in the error buffer (NVM) and depending on the relevancy of the error bit the set will either go into the protection-mode or not.

- HFB: Horizontal Flyback. If the horizontal flyback is not present, then this is detected via the HOP (HFB_X-RAY_PROT). One status bit is set to 'high'. The error code is stored in the error buffer and the set will go into the protection mode
- Flash detection. From the EHT-info, via D6303 and T7303 a flash will stop the H-drive and line output stage immediately. The FLS-bit in the status register of the HOP is set to 'high'. As the duration of a flash is very short the FLS-bit will be reset to 'low' again after the flash refresh, so via a slow start the set will be started again.

Hardware related protections

Due to the architecture (with 'hot' deflection) there are two protections that are 'unknown' to the microprocessor, namely the 'BRIDGE_PROT' from the line-stage and the 'NO_VFB' protection form the frame-stage. If one of these protections is triggered, the set is positioned in 'Standby'-mode. The OTC will now try to re-start the set. If this will not succeed after 5 times (after ≈ 1 minute), the OTC will generate error 15 (Flash protection) and will start the blinking red LED.

5.7 Repair tips

5.7.1 General

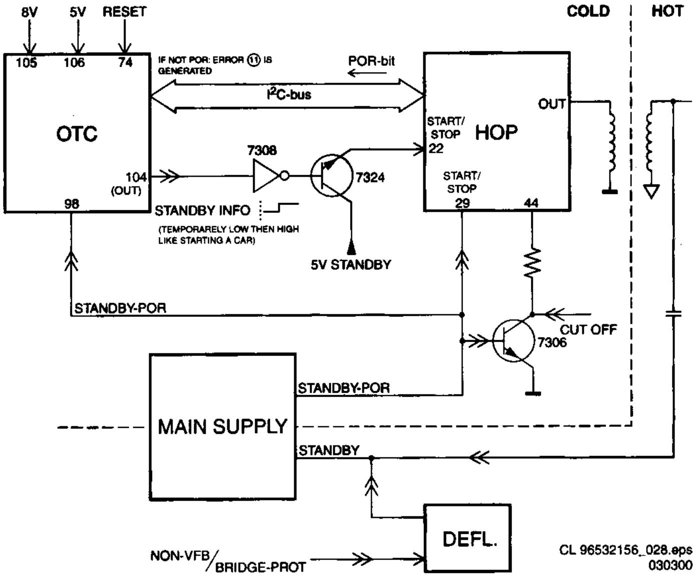


Figure 5-6

The start-up of the set is very different as of other sets:

1. When the set is switched 'ON', first the HOP is placed in 'low power start-up' mode (HOP-standby-mode). This means that 5 V (derived from available Standby-supply) is connected to pin 22 of the HOP-IC.
2. Now the HOP is driving the line-circuitry with 50 kHz pulses. At the base of the line-transistor this is sensed via the 'STANDBY'-line.
3. This signal triggers the Main supply to operate. Now the line-stage has 'BAT'-voltage (141 V), it will also start.
4. After the 5 and 8 V-supply lines are sensed by the OTC, it will read the POR-bit from the HOP via the I^2C-bus.
5. Now the HOP is switched in 'ON'-mode and the set will start-up further with normal drive (31.25 kHz for PAL).
6. The last step will be the unblanking of the picture.

SO STANDBY IS NOT CONTROLLED VIA A STANDBY-LINE FROM MICROPROCESSOR, BUT IS ACHIEVED INDIRECTLY VIA THE HOP-CIRCUITRY.

Notice that a very big part of the set (Large Signal Panel) is 'hot', meaning the primary part of the Standby supply, the whole Main supply (except for the secondary Audio supply) and the complete deflection circuit. SO NOTICE THAT THE DEFLECTION-COIL IS HOT!

This set does not have an IR transmitting-LED anymore. In its place, a Service (ComPair) connector is implemented at the rear of the set, which is directly accessible. In addition to this, there is a blinking LED procedure to show the contents of the error buffer.

The relay you hear during switching 'ON' (via the main switch) is from the degaussing-circuitry. So it is not used for switching the supply as in the MG-chassis.

When using ComPair (connect cable to ComPair-connector at the rear of the set, placed behind a separate cover), there exists the possibility to have a stepwise start-up procedure. With this mode one can startup the set step-by-step. This also means that in certain steps some protections will not be activated. This can sometimes be convenient during repair. See table in 5.4.3, which is describing the stepwise start-up mode with belonging LED behaviour.

On the SSB there are 'service pads' implemented to activate (via bridging) the SDM- or SAM-mode (see chapter 4). When the SDM-mode is activated, the processor-controlled protections (so not the Hardware and HOP-protections) can be overruled. This means that the ADC-input protections (5- and 8 V) and the I^2C not-acknowledging info from Tuner and FBX can be overruled.
WHEN DOING SO THE SERVICE-ENGINEER MUST KNOW WHAT HE IS DOING, AS IT COULD LEAD TO DAMAGING THE SET.

'Repair-tips how to repair the Main power supply:

- Simplest way is to replace components of the Main supply with repair kit (3122 785 90100)
- More detailed way:
  - Replace FET 7504 and zener 6505
  - Remove SSB-panel
  - Short-circuit BE of TS7529 in order to put supply in 'on'-mode (TS7529 is blocking then)
  - Load capacitor C2515 (V_{BAT}) with a load of 500 ohm. Supply can not work without a minimum load.
  - Use a variac to slowly increase the V_{MAINS}. Measure over sensing-resistors R3514/15 whether a nice sawtooth-voltage becomes available. Also measure the V_{BAT}-output
  - V_{BAT} may never exceed 141 V. If so there is something wrong in the feedback-circuitry (e.g. regulator 7506)

Repair-tips how to repair the Standby power supply:

- Simplest way is to replace components of the Standby supply with repair kit (3122 785 90110)

Repair-tips how to repair the Deflection-circuitry:

- Simplest way is to replace components of the Deflection-circuitry with repair kit (3122 785 90120)

Service-tips:

- Be careful measuring on gate of FET 7504. Circuitry is very high ohmic and can easily be damaged.
- Take care not to touch 'hot' heatsink while disconnecting SSB, despite the fact that mains cord is out of mains socket. There still is an annoying rest-voltage for a short while.
- Do not try to measure on side of SSB directed to the hot heatsink. This is dangerous. All service test points are guided to the Tuner side and are pointed out by service printing. Where the circuitry was too crowded to place this service-printing it has been explained on the Test point overviews in this manual

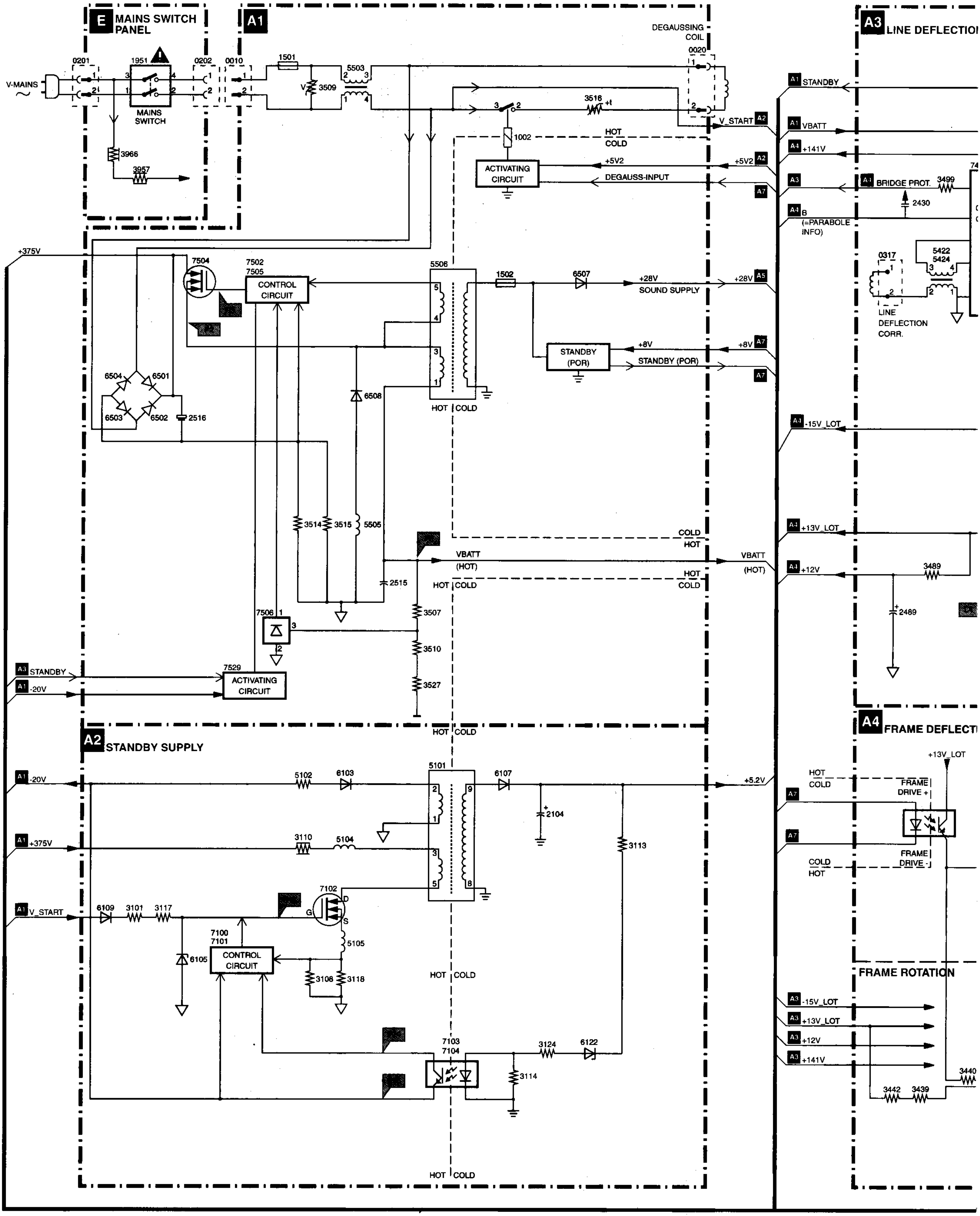
5.7.2 Repair tips

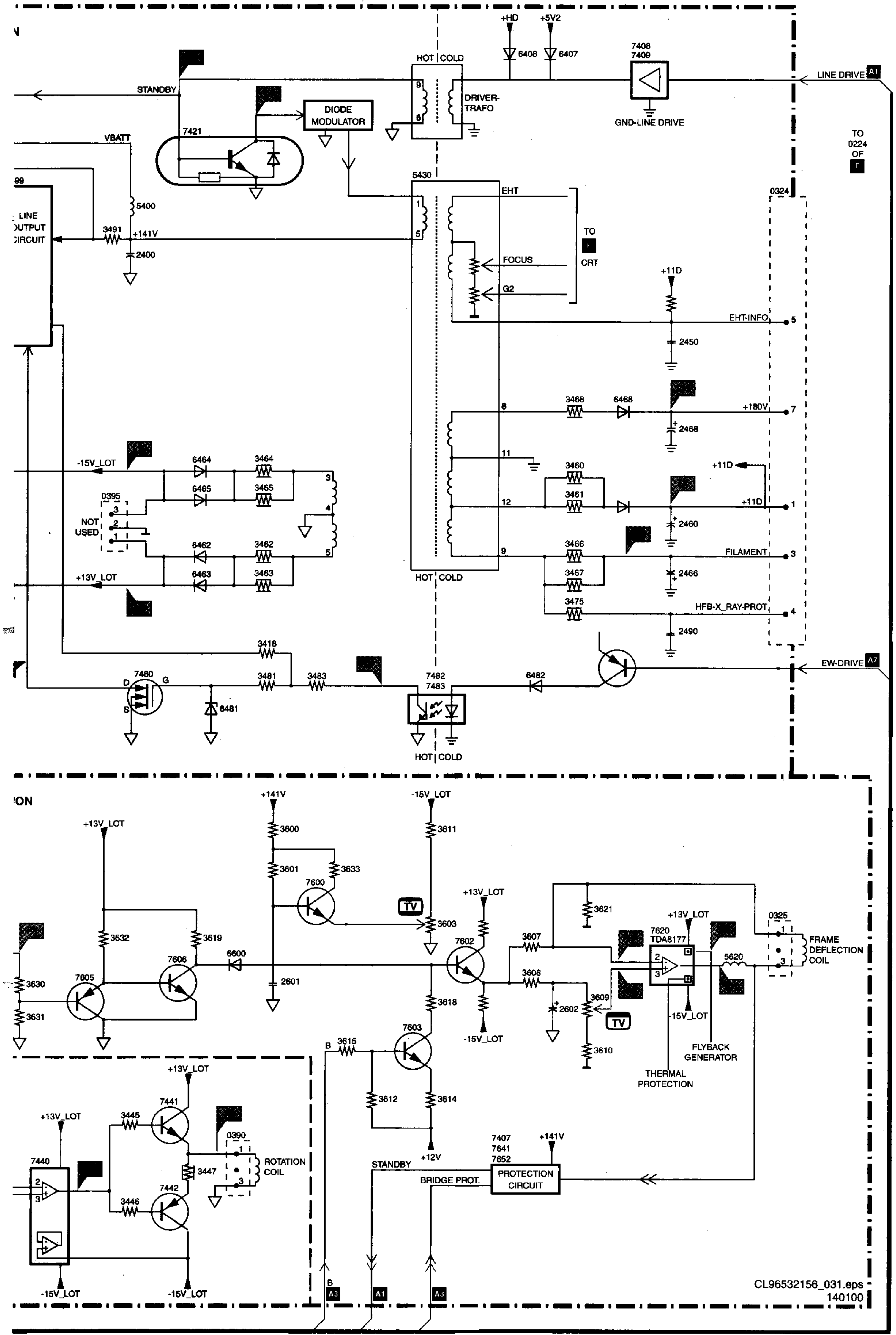
Phenomenon	Possible Cause	Repair-tip
No picture, no LED.	Standby Supply defective.	Measure circuitry (see diagram A2). Start at testpoint P16. Regardless the mode of the set, this voltage should always be available.
No picture, red LED (high intensity) despite expectation the set should be 'on' (this looks like Standby).	There are 2 protections that are not 'seen' by processor, that force set in 'Standby'-mode, namely 'NO-VFB-prot' (= no frame-deflection), or 'BRIDGE_PROT' (safety error).	If protection is activated by 'NO_VFB-prot', this can be measured with a scope on service test point F10 (diagram A4). Before this protection is activated, a few seconds a horizontal white line is visible. The 'BRIDGE_PROT' error may never occur. Is implemented due to legal requirements. Flash protection error (15) will be generated in both cases after 5 restart attempts. Visible via blinking LED procedure. NO_VFB-prot can be determinated by white line.
No picture, red LED blinking (3 Hz).	Set is in protection due to various causes. For error codes see error-code list.	You have no picture, so: - or you read out error buffer via ComPair - or you read out blinking LED information via 'diagnose' x dealer remote - or you read out blinking LED sequence via <default>-button dealer remote - or you read out blinking LED sequence via service default mode entered via RC-command 062596 + 'menu' When error is known, check circuitry related to supply-voltage and I^2C-communication.
No picture, red LED blinking code 6,6,6 or 1,1,1	No communication on I^2C-bus or NVM-I^2C-bus to processor. Set is in protection-mode	As processor cannot communicate with one of the 2 busses it spontaneously starts blinking. Measure dependent of the error on the I^2C-bus which device is loading the bus. This protection can be overruled via SDM-entry on SSB or via stepwise start-up mode step 'MainPowerOn'.
No picture, no sound, set is making audible squeaking sound	Supply could be in hiccup-mode which can be heard via supply-transformer squeaking	This could be caused by: - Short-circuited V_{BAT} (caused by short circuited line transistor 7421) or - Short-circuited sound-winding (amplifier is short-circuiting 28 V) or - Short-circuited D6514 (due to a too high V_{BAT}). Delete excessive load to see where failure is caused by or check feed back circuit. See repair-tip main power supply (supply needs a minimal load).
No picture, no sound, LED works fine	Supply does not work correctly	If e.g. V_{BAT} is only about 90 V, regulator-IC 7506 could be damaged.
No RC5-reception. Red LED does not echo RC-commands.	Processor-circuitry or RC-receiver is wrong.	In case set reacts on local keyboard operation, error must be found in the IR-receiver circuitry (diagram E).
Relay-activation (degaussing) not audible when switch set 'on' from 'off'.	Processor not working correctly.	Check RESET-circuitry on diagram B5. When switching on the set all i/o-pins of processor should become high for a moment, so also the degauss-input signal.
No sound, but picture.	Measure P7 on diagram A1. Possible sound-amplifier is broken (but not short-circuited), or sound-enable line is high (see diagram A5). Further the audio-signal path must be measured (HIP, MSP, switch-IC's, amplifier).	Measure and repair. With ComPair there is a beep-test that can determine where the signal stops (use loudspeakers, headphone).
No sound at headphone output.	Discrete amplifiers or supply to it could be damaged.	Measure A12, A13, A14, A15 and supply-line on diagram A6.
Picture is rotated.	Rotation-circuitry or supply to it could be damaged.	Measure test points F3, R1, R2 on diagram A4.
No picture.	Check functionality and cabling Tuner to SSB.	Notice cable 0946.
Picture looks like cushion, further O.K.	Or NVM-content is overwritten or E/W-MOSFET is short-circuited	First check in Service Alignment Mode, whether geometry can be restored. If not check testpoint L4 and diagram A3, or measure with an ohm-meter whether TS7480 is defective.
Very white picture, with flyback lines visible	180 V is missing on CRT-panel	Probably R3468 on LSP (diagram A3) is interrupted, or bad connection plug 0324 to 0224 (CRT-panel).
Un-sharp picture	Focus could be mis-aligned or SCAVEM-circuitry does not work correctly	Align focus-potmeter of Line Transformer; check SCAVEM-circuitry on CRT-panel [F].
Un-synced picture	Sync is derived in HIP-IC from X-tals 1305 and/or 1308	Maybe a X-tal is making bad contact.
Picture distorted.	Check video-path, service default mode.	Investigate whether there exist an error code in the error buffer. In case there is an error code, check I^2C-bus and/or supply-lines (see overview supply-lines). Measure and check signal path Tuner, HIP, PICNIC, HOP, RGB-amplifier. In case it is a geometry-issue, check Frame-circuitry, alignments or possible corrupted NVM (7011)
No menu, OSD.	Probably processor is defective.	Measure test points C7, C8, C9, C10 on diagram B5.

cl96532156-037.eps
090200

6. Wiring diagram, blockdiagram, supply diagram and testpoints

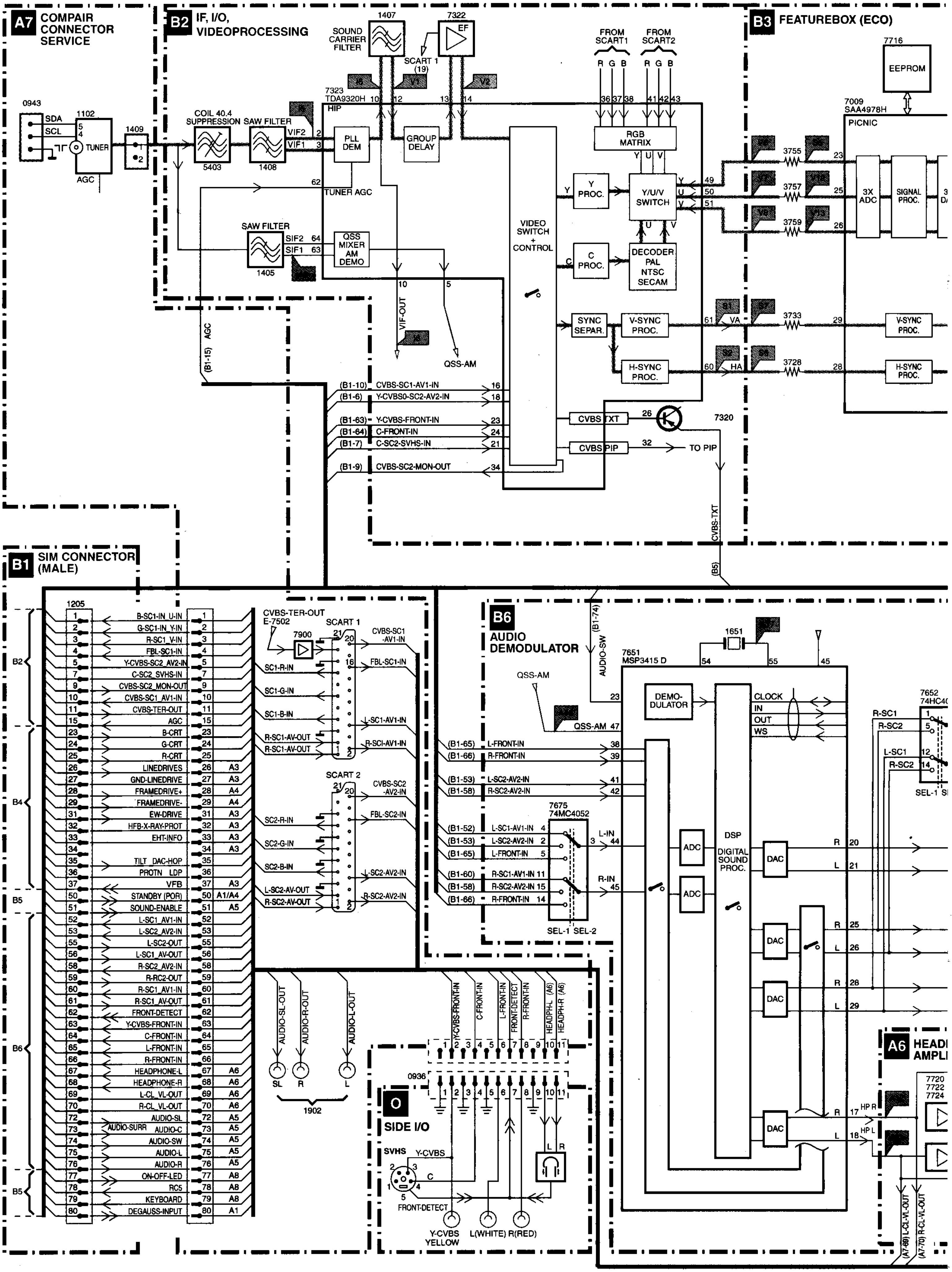
Blockdiagram

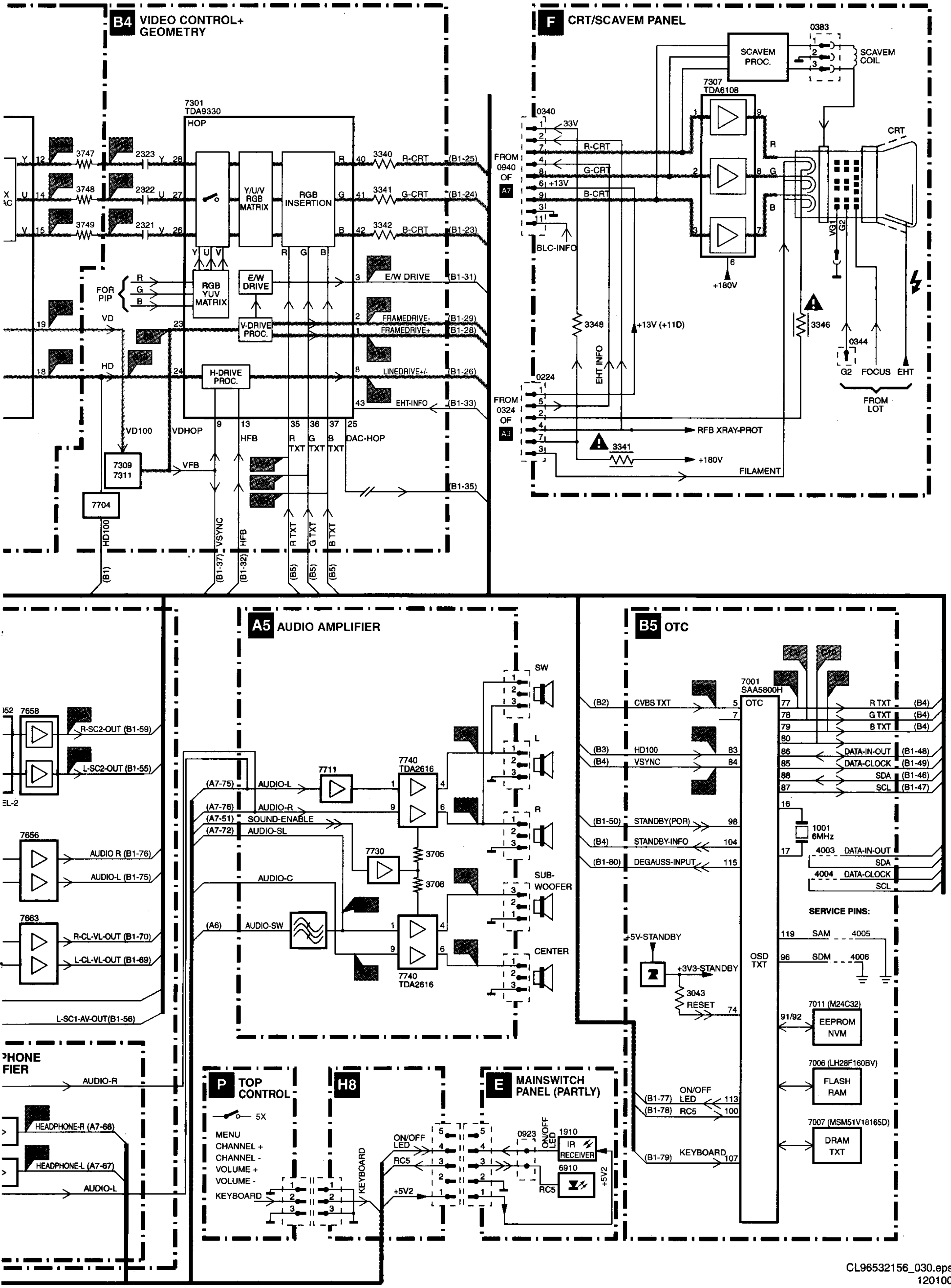

E MAINS SWITCH PANEL
A1
A3 LINE DEFLECTIO
V-MAINS
0201
1951
MAINS SWITCH
0202
0010
1501
5503
3509
DEGAUSSING COIL
0020
3516
+t
V_START A2
3966
3957
1002
HOT
COLD
ACTIVATING CIRCUIT
+5V2
+5V2 A2
DEGAUSS-INPUT
A7
A1 STANDBY
A1 VBATT
A4 +141V
A3
A1 BRIDGE PROT.
3499
2430
A4 B (=PARABOLE INFO)
0317
5422
5424
LINE DEFLECTION CORR.
+375V
7504
7502
7505
CONTROL CIRCUIT
5506
1502
6507
+28V SOUND SUPPLY
+28V A5
STANDBY (POR)
+8V
+8V A7
STANDBY (POR)
A7
6504
6501
6503
6502
2516
6508
HOT COLD
A1 -15V_LOT
3514
3515
5505
A1 +13V_LOT
COLD
HOT
VBATT (HOT)
VBATT (HOT)
A1 +12V
3489
2515
HOT COLD
HOT
COLD
2489
7506
3507
3510
3527
A3 STANDBY
A1 -20V
7529
ACTIVATING CIRCUIT
A2 STANDBY SUPPLY
HOT COLD
A4 FRAME DEFLECTI
+13V_LOT
A1 -20V
5102
6103
5101
6107
+5.2V
2104
HOT
COLD
FRAME DRIVE +
A7
A7
A1 +375V
3110
5104
3113
FRAME DRIVE -
COLD
HOT
7102
A1 V_START
6109
3101
3117
D
G
S
7100
7101
5105
6105
CONTROL CIRCUIT
3108
3118
HOT COLD
FRAME ROTATION
A3 -15V_LOT
A3 +13V_LOT
A3 +12V
A3 +141V
7103
7104
3124
6122
3114
3440
3442
3439
HOT COLD



N
STANDBY
DIODE MODULATOR
VBATT
LINE OUTPUT CIRCUIT
+141V
HOT COLD
DRIVER-TRAFO
+HD
+5V2
GND-LINE DRIVE
LINE DRIVE A1
TO 0224 OF F
EHT
FOCUS
G2
TO F CRT
+11D
EHT-INFO
+180V
+11D
+11D
FILAMENT
HFB-X_RAY-PROT
HOT COLD
-15V_LOT
NOT USED
+13V_LOT
D
G
S
EW-DRIVE A7
HOT COLD
ON
+13V_LOT
+141V
-15V_LOT
TV
+13V_LOT
+13V_LOT
TDA8177
FRAME DEFLECTION COIL
TV
-15V_LOT
-15V_LOT
FLYBACK GENERATOR
THERMAL PROTECTION
B
+12V
+13V_LOT
ROTATION COIL
+13V_LOT
-15V_LOT
-15V_LOT
STANDBY
+141V
PROTECTION CIRCUIT
BRIDGE PROT.
B
A3
A1
A3
CL96532156_031.eps
140100

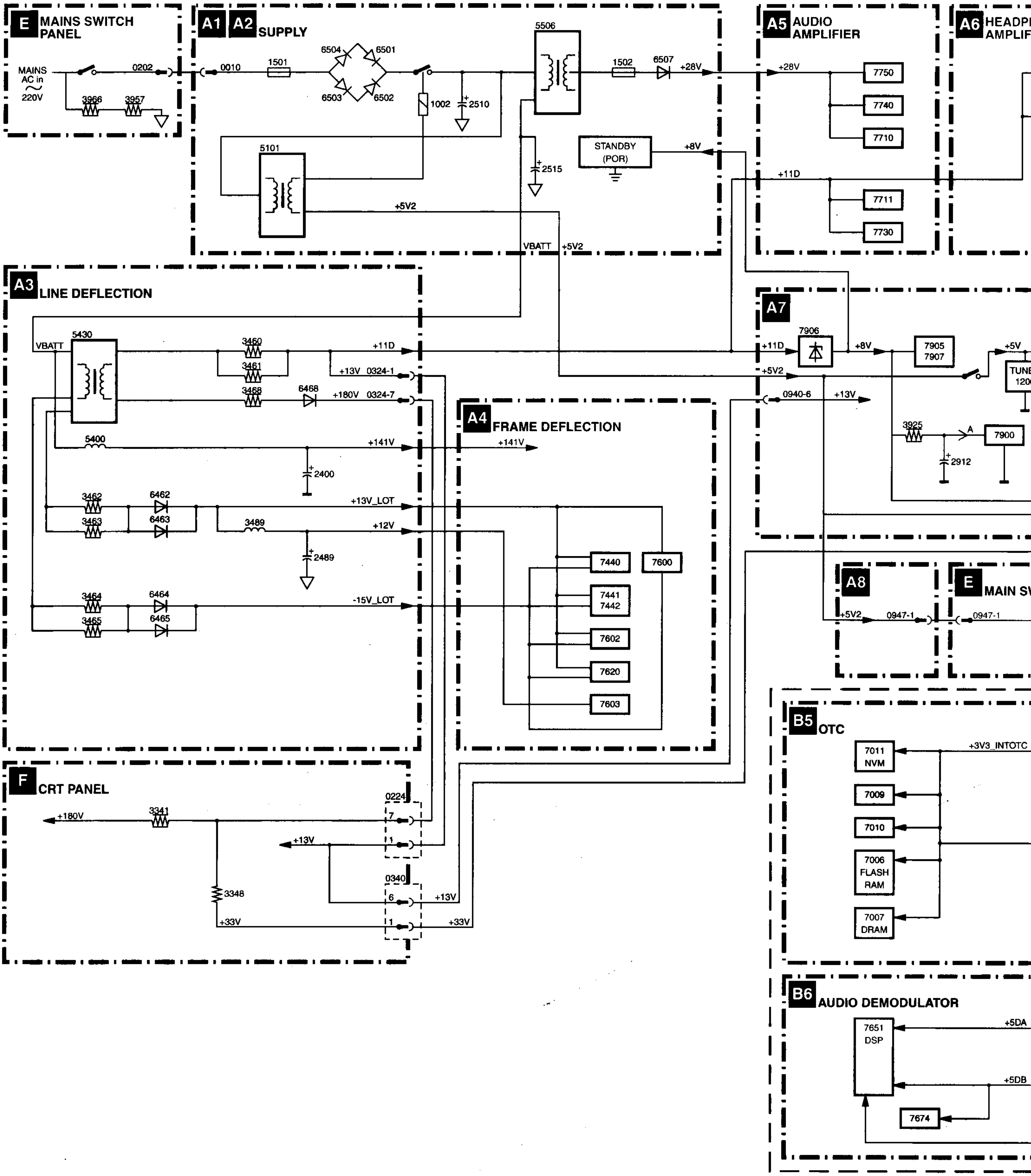
Blockdiagram

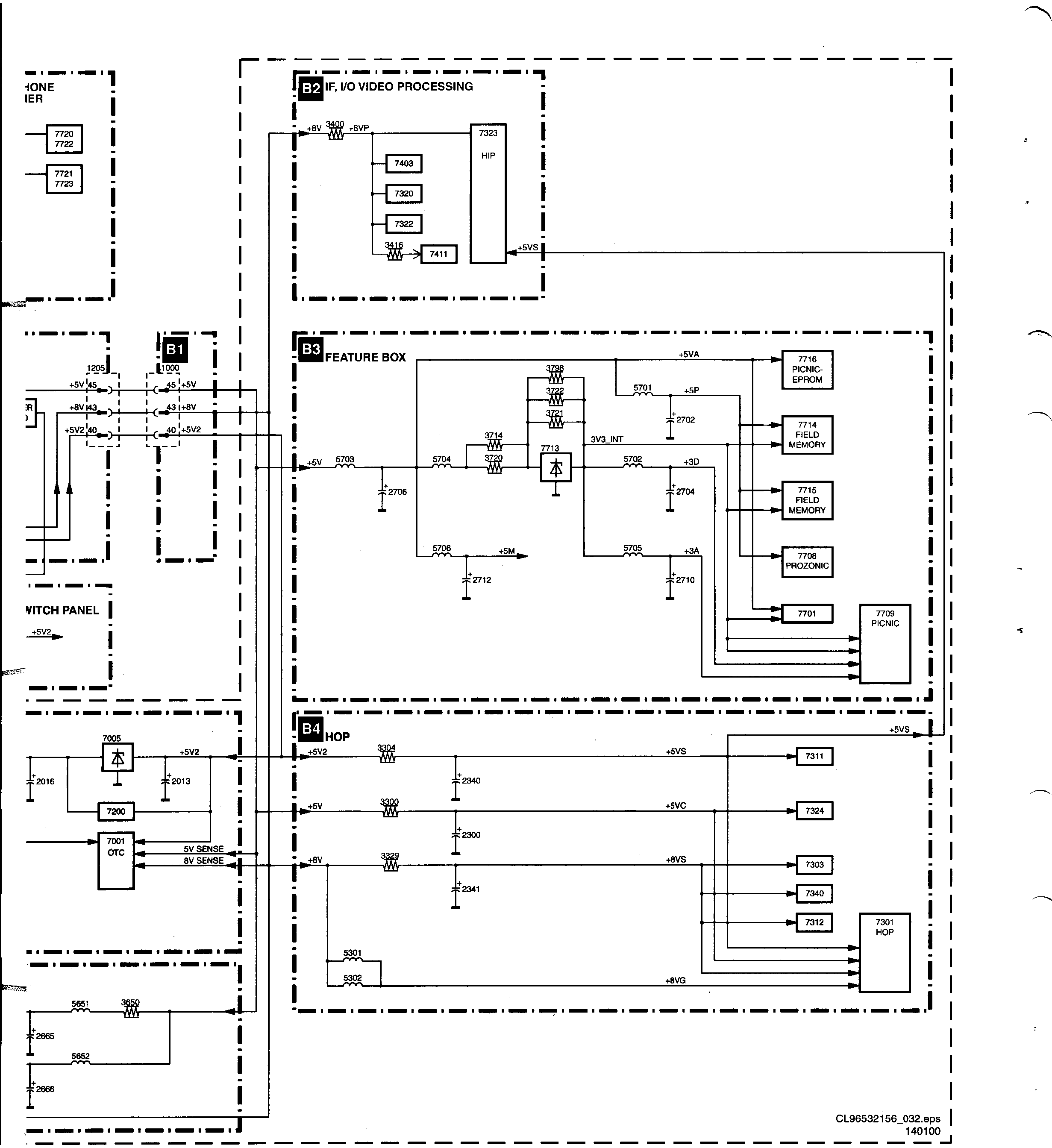

A7 COMPAIR CONNECTOR SERVICE
0943
SDA
SCL
1102
TUNER
AGC
1409
B2 IF, I/O, VIDEOPROCESSING
COIL 40.4 SUPPRESSION
5403
SAW FILTER
1408
VIF2
VIF1
SOUND CARRIER FILTER
1407
7322
EF
SCART 1 (19)
7323 TDA9320H HIP
PLL DEM
GROUP DELAY
TUNER AGC
SAW FILTER
1405
SIF2
SIF1
QSS MIXER AM DEMO
VIF-OUT
QSS-AM
VIDEO SWITCH + CONTROL
FROM SCART1
FROM SCART2
R G B
RGB MATRIX
Y PROC.
C PROC.
Y/U/V SWITCH
DECODER PAL NTSC SECAM
SYNC SEPAR.
V-SYNC PROC.
H-SYNC PROC.
CVBS TXT
CVBS PIP
7320
TO PIP
CVBS-TXT
(B1-15) AGC
(B1-10) CVBS-SC1-AV1-IN
(B1-6) Y-CVBS0-SC2-AV2-IN
(B1-63) Y-CVBS-FRONT-IN
(B1-64) C-FRONT-IN
(B1-7) C-SC2-SVHS-IN
(B1-9) CVBS-SC2-MON-OUT
B3 FEATUREBOX (ECO)
7716
EEPROM
7009 SAA4978H
PICNIC
3755
3757
3759
3X ADC
SIGNAL PROC.
3733
3728
VA
HA
V-SYNC PROC.
H-SYNC PROC.
B1 SIM CONNECTOR (MALE)
1205
1 B-SC1-IN_U-IN
2 G-SC1-IN_Y-IN
3 R-SC1_V-IN
4 FBL-SC1-IN
5 Y-CVBS-SC2_AV2-IN
7 C-SC2_SVHS-IN
9 CVBS-SC2_MON-OUT
10 CVBS-SC1_AV1-IN
11 CVBS-TER-OUT
15 AGC
23 B-CRT
24 G-CRT
25 R-CRT
26 LINEDRIVES A3
27 GND-LINEDRIVE A3
28 FRAMEDRIVE+ A4
29 FRAMEDRIVE- A4
31 EW-DRIVE A3
32 HFB-X-RAY-PROT A3
33 EHT-INFO A3
34 A3
35 TILT_DAC-HOP
36 PROTN_LDP
37 VFB A3
50 STANDBY (POR) A1/A4
51 SOUND-ENABLE A5
52 L-SC1_AV1-IN
53 L-SC2_AV2-IN
55 L-SC2-OUT
56 L-SC1_AV-OUT
58 R-SC2_AV2-IN
59 R-RC2-OUT
60 R-SC1_AV1-IN
61 R-SC1_AV-OUT
62 FRONT-DETECT
63 Y-CVBS-FRONT-IN
64 C-FRONT-IN
65 L-FRONT-IN
66 R-FRONT-IN
67 HEADPHONE-L A6
68 HEADPHONE-R A6
69 L-CL_VL-OUT A6
70 R-CL_VL-OUT A6
72 AUDIO-SL A5
73 AUDIO-SURR AUDIO-C A5
74 AUDIO-SW A5
75 AUDIO-L A5
76 AUDIO-R A5
77 ON-OFF-LED A8
78 RC5 A8
79 KEYBOARD A8
80 DEGAUSS-INPUT A1
B2
B4
B5
B6
B5
CVBS-TER-OUT E-7502
7900
SCART 1
CVBS-SC1 -AV1-IN
FBL-SC1-IN
SC1-R-IN
SC1-G-IN
SC1-B-IN
L-SC1-AV1-IN
R-SC1-AV-OUT
R-SC1-AV-OUT
R-SC1-AV1-IN
SCART 2
CVBS-SC2 -AV2-IN
FBL-SC2-IN
SC2-R-IN
SC2-G-IN
SC2-B-IN
L-SC2-AV2-IN
L-SC2-AV-OUT
R-SC2-AV-OUT
R-SC2-AV2-IN
AUDIO-SL-OUT
AUDIO-R-OUT
AUDIO-L-OUT
SL R L
1902
B6 AUDIO DEMODULATOR
(B1-74) AUDIO-SW
QSS-AM
1651
7651 MSP3415 D
DEMO-DULATOR
CLOCK
IN
OUT
WS
(B1-65) L-FRONT-IN
(B1-66) R-FRONT-IN
(B1-53) L-SC2-AV2-IN
(B1-58) R-SC2-AV2-IN
7675 74MC4052
(B1-52) L-SC1-AV1-IN
(B1-53) L-SC2-AV2-IN
(B1-65) L-FRONT-IN
(B1-60) R-SC1-AV1-IN
(B1-58) R-SC2-AV2-IN
(B1-66) R-FRONT-IN
L-IN
R-IN
SEL-1 SEL-2
ADC
DSP DIGITAL SOUND PROC.
DAC
7652 74HC4
R-SC1
R-SC2
L-SC1
L-SC2
SEL-1
A6 HEAD AMPL
7720 7722 7724
HP R
HP L
(A7-69) L-CL-VL-OUT
(A7-70) R-CL-VL-OUT
Y-CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
FRONT-DETECT
R-FRONT-IN
HEADPH-L (A6)
HEADPH-R (A6)
0936
O SIDE I/O
SVHS
Y-CVBS
C
FRONT-DETECT
Y-CVBS YELLOW
L(WHITE)
R(RED)


B4 VIDEO CONTROL+ GEOMETRY
7301
TDA9330
HOP
Y/U/V RGB MATRIX
RGB INSERTION
RGB YUV MATRIX
E/W DRIVE
V-DRIVE PROC.
H-DRIVE PROC.
FOR PIP
R
G
B
3747
3748
3749
2323
2322
2321
3340
3341
3342
R-CRT
G-CRT
B-CRT
(B1-25)
(B1-24)
(B1-23)
E/W DRIVE
(B1-31)
FRAMEDRIVE-
(B1-29)
FRAMEDRIVE+
(B1-28)
LINEDRIVE+/-
(B1-26)
EHT-INFO
(B1-33)
(B1-35)
VD
HD
VD100
VDHOP
VFB
7309
7311
7704
HD100
VSYNC
HFB
R TXT
G TXT
B TXT
DAC-HOP
(B1)
(B1-37)
(B1-32)
(B5)
F CRT/SCAVEM PANEL
SCAVEM PROC.
0383
SCAVEM COIL
7307
TDA6108
0340
33V
+13V
BLC-INFO
FROM 0940 OF A7
CRT
VG1
G2
+180V
3348
+13V (+11D)
EHT INFO
3346
0344
G2
FOCUS
EHT
FROM LOT
0224
FROM 0324 OF A3
RFB XRAY-PROT
3341
+180V
FILAMENT
A5 AUDIO AMPLIFIER
SW
L
R
SUB-WOOFER
CENTER
7711
7740
TDA2616
7730
3705
3708
(A7-75)
AUDIO-L
(A7-76)
AUDIO-R
(A7-51)
SOUND-ENABLE
(A7-72)
AUDIO-SL
AUDIO-C
(A6)
AUDIO-SW
7658
R-SC2-OUT (B1-59)
L-SC2-OUT (B1-55)
7656
AUDIO R (B1-76)
AUDIO-L (B1-75)
7663
R-CL-VL-OUT (B1-70)
L-CL-VL-OUT (B1-69)
L-SC1-AV-OUT(B1-56)
PHONE
FIER
AUDIO-R
HEADPHONE-R (A7-68)
HEADPHONE-L (A7-67)
AUDIO-L
B5 OTC
7001
SAA5800H
OTC
(B2) CVBS TXT
(B3) HD100
(B4) VSYNC
(B1-50) STANDBY(POR)
(B4) STANDBY-INFO
(B1-80) DEGAUSS-INPUT
R TXT (B4)
G TXT (B4)
B TXT (B4)
DATA-IN-OUT (B1-48)
DATA-CLOCK (B1-49)
SDA (B1-46)
SCL (B1-47)
1001
6MHz
4003 DATA-IN-OUT
SDA
4004 DATA-CLOCK
SCL
SERVICE PINS:
SAM 4005
SDM 4006
+5V-STANDBY
+3V3-STANDBY
3043
RESET
OSD TXT
7011 (M24C32)
EEPROM NVM
7006 (LH28F160BV)
FLASH RAM
7007 (MSM51V18165D)
DRAM TXT
(B1-77) ON/OFF LED
(B1-78) RC5
(B1-79) KEYBOARD
P TOP CONTROL
5X
MENU
CHANNEL +
CHANNEL -
VOLUME +
VOLUME -
KEYBOARD
H8
ON/OFF LED
RC5
+5V2
E MAINSWITCH PANEL (PARTLY)
0923
1910
IR RECEIVER
6910
RC5
ON/OFF LED
+5V2

CL96532156_030.eps
120100

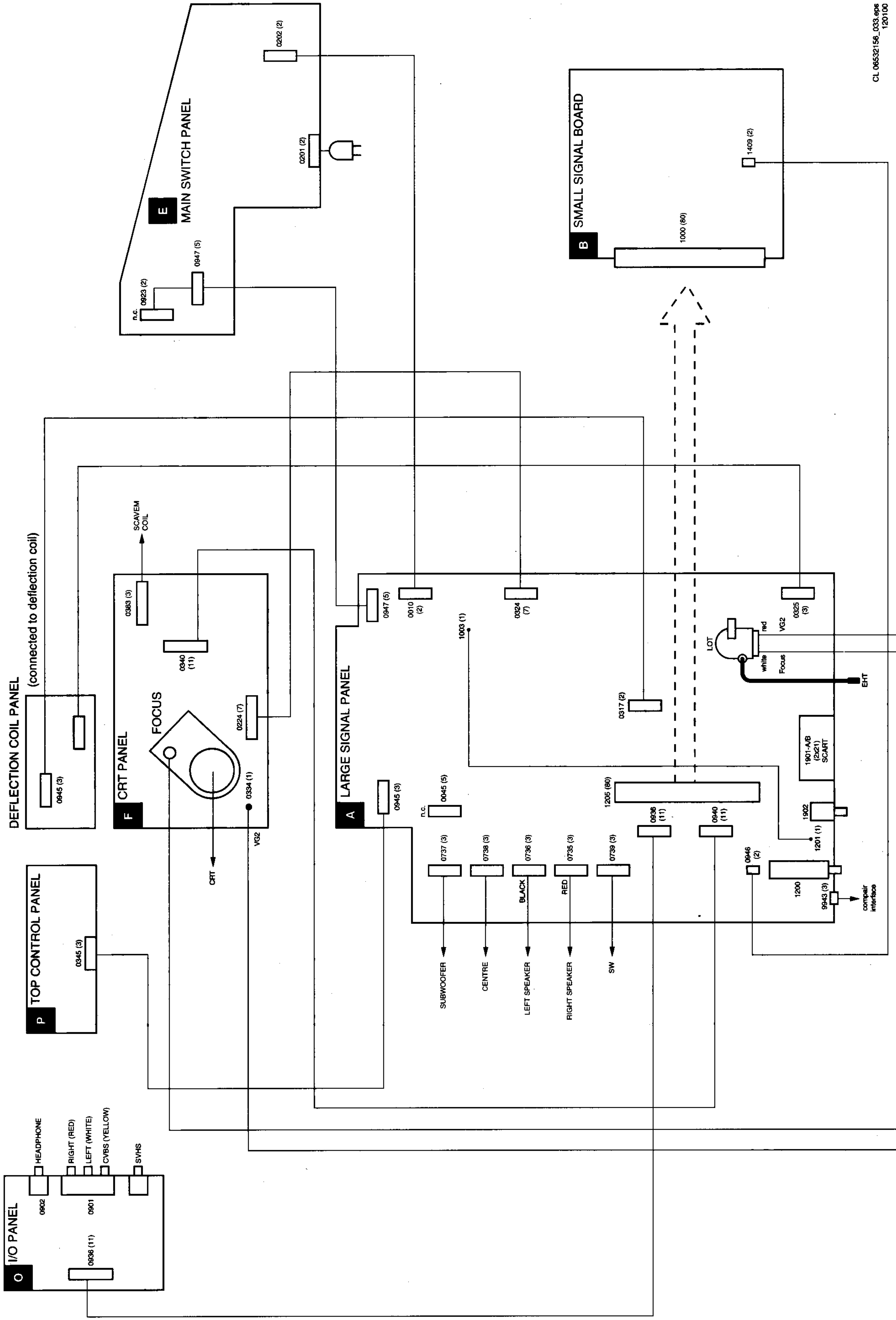
Supply lines overview


E MAINS SWITCH PANEL
MAINS AC in 220V
0202
3966
3957
A1 A2 SUPPLY
0010
1501
6504
6501
6503
6502
1002
2510
5506
1502
6507
+28V
5101
2515
STANDBY (POR)
+8V
+5V2
VBATT
+5V2
A5 AUDIO AMPLIFIER
+28V
7750
7740
7710
+11D
7711
7730
A6 HEADPH AMPLIF
A3 LINE DEFLECTION
VBATT
5430
3460
3461
+11D
+13V 0324-1
3468
6468
+180V 0324-7
5400
+141V
2400
3462
6462
3463
6463
+13V_LOT
3489
+12V
2489
3464
6464
3465
6465
-15V_LOT
A4 FRAME DEFLECTION
+141V
7440
7600
7441 7442
7602
7620
7603
A7
7906
+11D
+8V
7905 7907
+5V
+5V2
TUNE 120
0940-6
+13V
3925
A
7900
2912
A8
+5V2
0947-1
E MAIN SW
0947-1
F CRT PANEL
+180V
3341
0224
7
1
+13V
0340
6
1
3348
+13V
+33V
+33V
B5 OTC
7011 NVM
+3V3_INTOTC
7009
7010
7006 FLASH RAM
7007 DRAM
B6 AUDIO DEMODULATOR
7651 DSP
+5DA
+5DB
7674

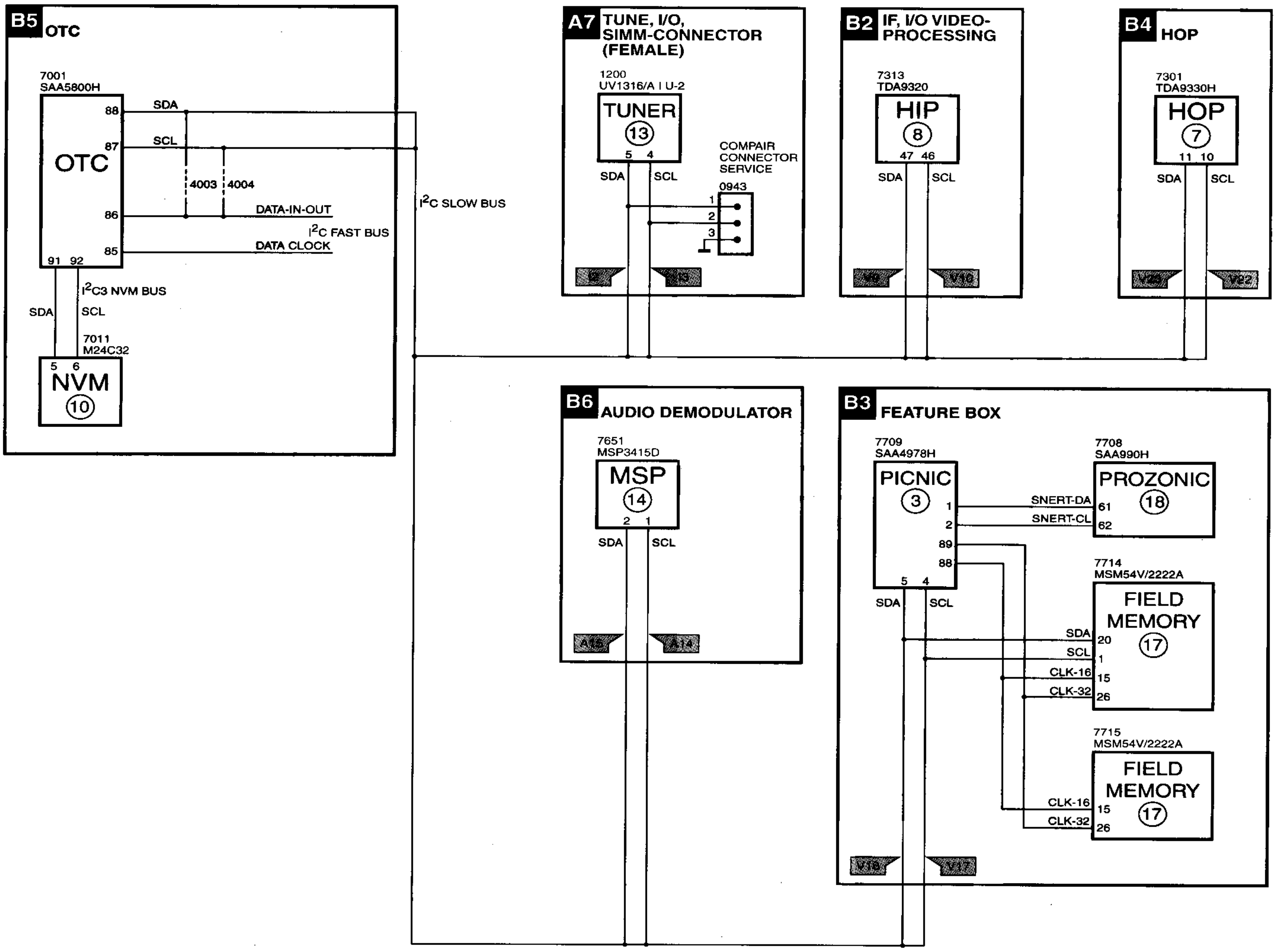

HONE
IER
7720
7722
7721
7723
B2 IF, I/O VIDEO PROCESSING
+8V
3400
+8VP
7323
HIP
7403
7320
7322
3416
7411
+5VS
B1
1205
1000
+5V
45
+8V
43
+5V2
40
B3 FEATURE BOX
+5VA
7716
PICNIC-
EPROM
3798
3722
3721
5701
+5P
2702
7714
FIELD
MEMORY
3714
3720
3V3_INT
+5V
5703
5704
7713
5702
+3D
2706
2704
7715
FIELD
MEMORY
5706
+5M
5705
+3A
2712
2710
7708
PROZONIC
7701
7709
PICNIC
WITCH PANEL
+5V2
B4 HOP
+5VS
7005
+5V2
3304
2016
2013
2340
7311
7200
+5V
3300
+5VC
7324
2300
7001
OTC
5V SENSE
8V SENSE
+8V
3329
+8VS
7303
2341
7340
7312
7301
HOP
5301
5302
+8VG
5651
3650
2665
5652
2666

CL96532156_032.eps
140100

I2C bus


CL 06532156_033.eps
120100
E MAIN SWITCH PANEL
0202 (2)
0201 (2)
0947 (5)
0923 (2)
n.c.
B SMALL SIGNAL BOARD
1409 (2)
1000 (80)
DEFLECTION COIL PANEL
(connected to deflection coil)
0945 (3)
F CRT PANEL
0383 (3)
SCAVEM COIL
0340 (11)
0224 (7)
FOCUS
0334 (1)
VG2
CRT
A LARGE SIGNAL PANEL
0947 (5)
0010 (2)
0324 (7)
0325 (3)
1003 (1)
LOT
red
VG2
white
Focus
EHT
0317 (2)
1901-A/B (2x21) SCART
1205 (80)
0945 (3)
n.c.
0045 (5)
0936 (11)
0940 (11)
1902
1201 (1)
0946 (2)
1200
9943 (3)
compair interface
0737 (3)
0738 (3)
0736 (3)
0735 (3)
0739 (3)
BLACK
RED
SUBWOOFER
CENTRE
LEFT SPEAKER
RIGHT SPEAKER
SW
P TOP CONTROL PANEL
0345 (3)
O I/O PANEL
HEADPHONE
RIGHT (RED)
LEFT (WHITE)
CVBS (YELLOW)
SVHS
0902
0901
0936 (11)

I2C overview


B5 OTC
7001
SAA5800H
OTC
88
87
86
85
91 92
SDA
SCL
4003
4004
DATA-IN-OUT
I2C FAST BUS
DATA CLOCK
I2C3 NVM BUS
SDA
SCL
7011
M24C32
5 6
NVM
10
I2C SLOW BUS
A7 TUNE, I/O, SIMM-CONNECTOR (FEMALE)
1200
UV1316/A I U-2
TUNER
13
5 4
SDA
SCL
COMPAIR CONNECTOR SERVICE
0943
1
2
3
B2 IF, I/O VIDEO-PROCESSING
7313
TDA9320
HIP
8
47 46
SDA
SCL
V9
V10
B4 HOP
7301
TDA9330H
HOP
7
11 10
SDA
SCL
V22
B6 AUDIO DEMODULATOR
7651
MSP3415D
MSP
14
2 1
SDA
SCL
A15
A14
B3 FEATURE BOX
7709
SAA4978H
PICNIC
3
1
2
89
88
5 4
SDA
SCL
7708
SAA990H
PROZONIC
18
SNERT-DA
SNERT-CL
61
62
7714
MSM54V/2222A
FIELD MEMORY
17
SDA
SCL
CLK-16
CLK-32
20
1
15
26
7715
MSM54V/2222A
FIELD MEMORY
17
CLK-16
CLK-32
15
26
V16
V17

~~Error~~	~~Device~~	~~Description~~	~~Defective item~~	~~Diagram~~	~~Defect. module indication~~
~~1~~	~~Beam Current protection~~	~~BC-PROT~~			~~Beam Current~~
~~2~~	~~H fail protection~~	~~HFB~~			~~Horizontal Flyback~~
~~3~~	~~SAA4978~~	~~PICNIC~~	~~7709~~	~~B3~~	~~Feature Box~~
~~4~~	~~Supply 5V~~	~~5V2~~			~~+5V Supply~~
~~5~~	~~Supply 5V~~	~~8V6~~			~~+8V Supply~~
~~6~~	~~Slow I^{2}C-bus blocked~~				~~Slow I^{2}C blocked~~
~~7~~	~~TDA9330~~	~~HOP video control/geometry~~	~~7301~~	~~B4~~	~~Video Controller~~
~~8~~	~~TDA9320~~	~~HIP I/O-video processing~~	~~7323~~	~~B2~~	~~Chroma IF IO~~
~~9~~	~~X-ray protection~~			~~A3~~	
~~10~~	~~ST24E32~~	~~NVM~~	~~7011~~	~~B5~~	~~Control~~
~~11~~	~~HOP protection~~				
~~12~~	~~Tuner protection~~	~~TUNER_prot~~			~~+8V (Tuner) Supply~~
~~13~~	~~UV1316~~	~~Tuner~~	~~U1200~~	~~A7~~	~~Tuner~~
~~14~~	~~MSP3451/3415~~	~~ITT sound processor + Dolby~~	~~7651~~	~~B6~~	~~Audio Module~~
~~15~~	~~Flash protection~~				
~~16~~	~~Featurebox protection~~	~~FBX_PROT~~			
~~17~~	~~SAA4956~~	~~DNR-memory~~	~~7714~~	~~B3~~	
~~18~~	~~SAA4990~~	~~PROZONIC~~	~~7708~~	~~B3~~	

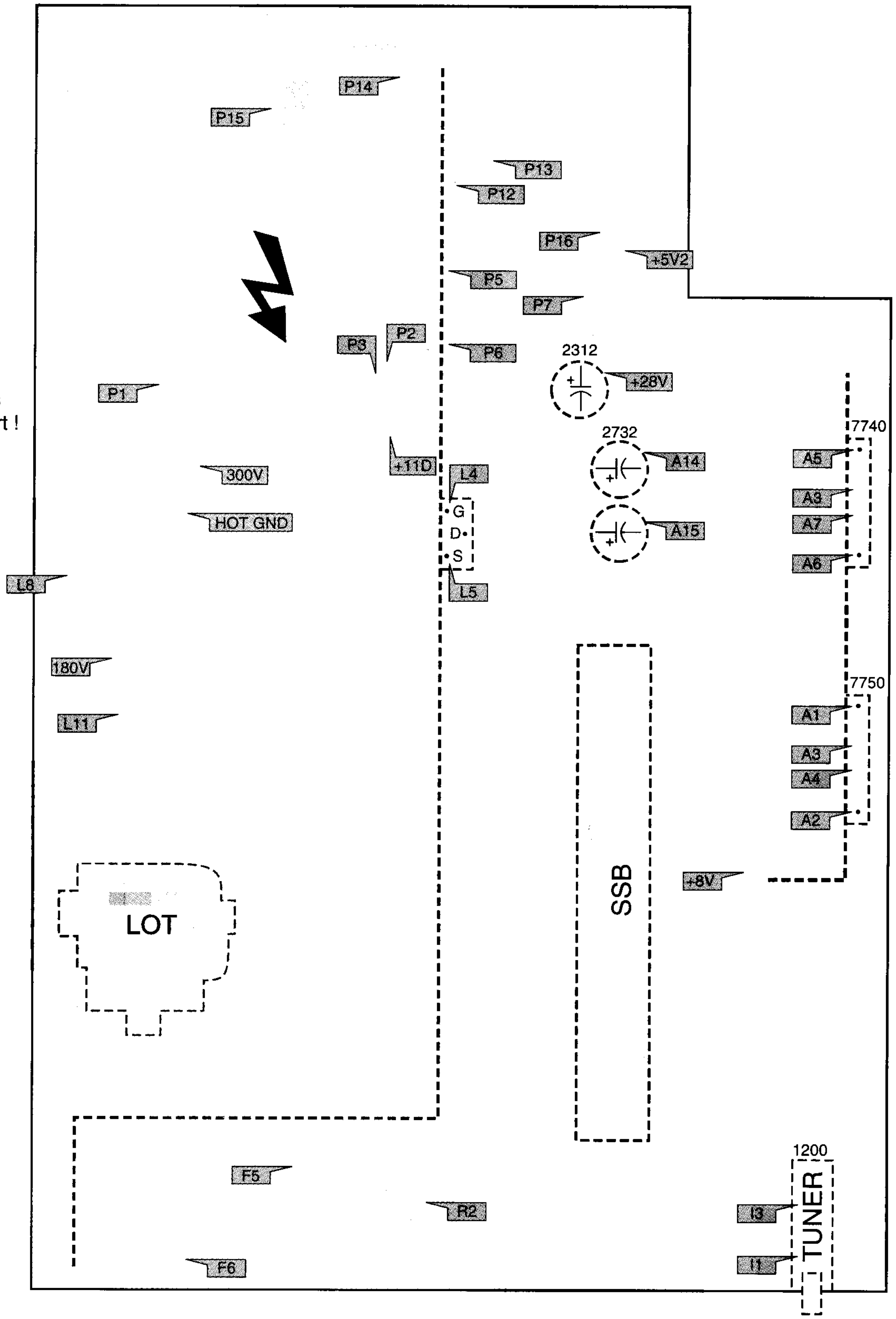
CL96532156_034.eps
140100

Testpoint overview LSP panel

Large Signal panel (LSP) (copper side)

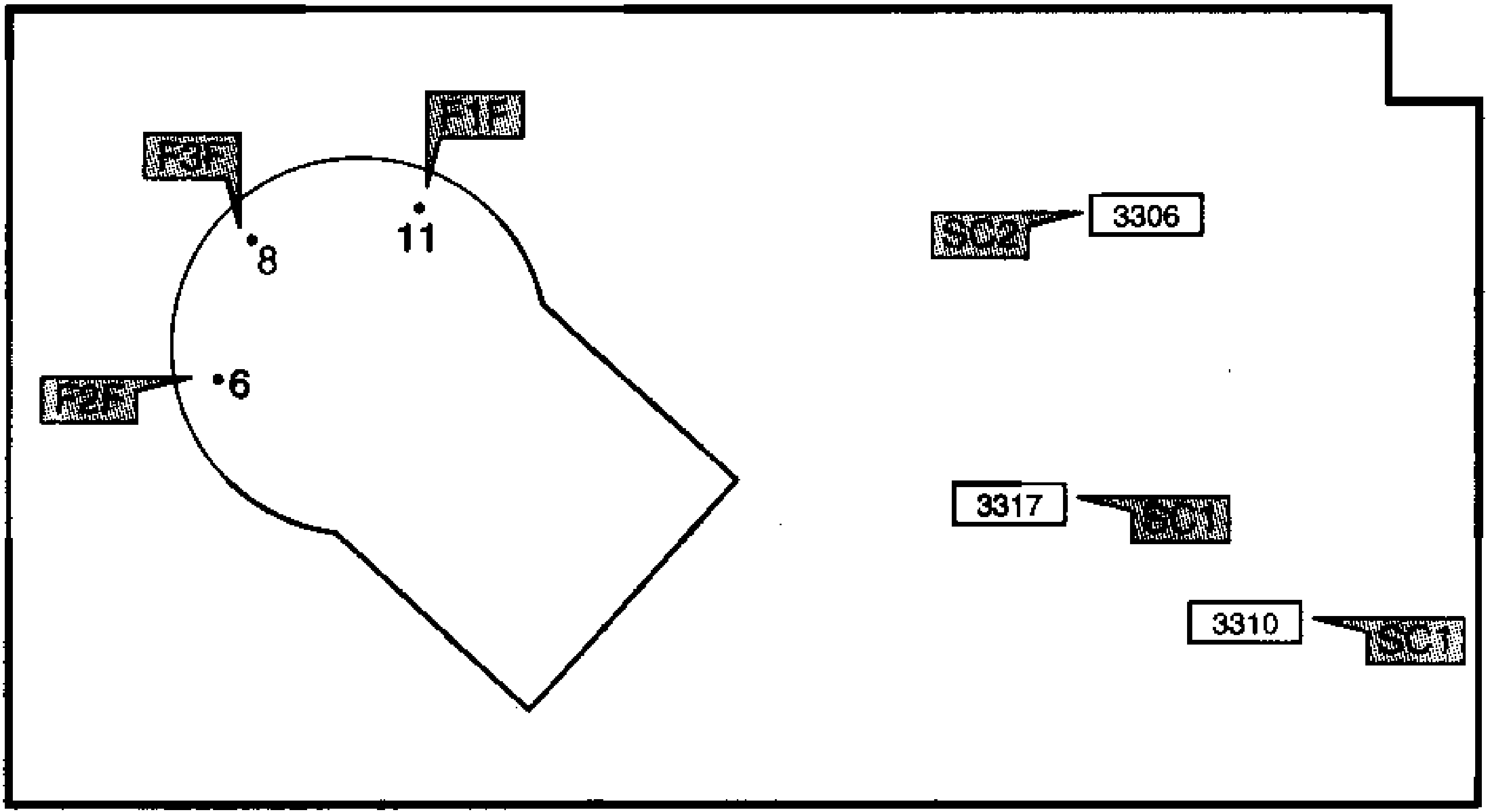
Warning

All alignments are on hot-part !


P14
P15
P13
P12
P16
+5V2
P5
P7
P3
P2
P6
2312
+28V
P1
2732
A14
7740
A5
A3
A7
A6
+11D
L4
G
D
S
L5
300V
HOT GND
A15
L8
180V
L11
7750
A1
A3
A4
A2
+8V
SSB
LOT
F5
R2
1200
TUNER
I3
I1
F6

CL 96532156_088.eps
280200

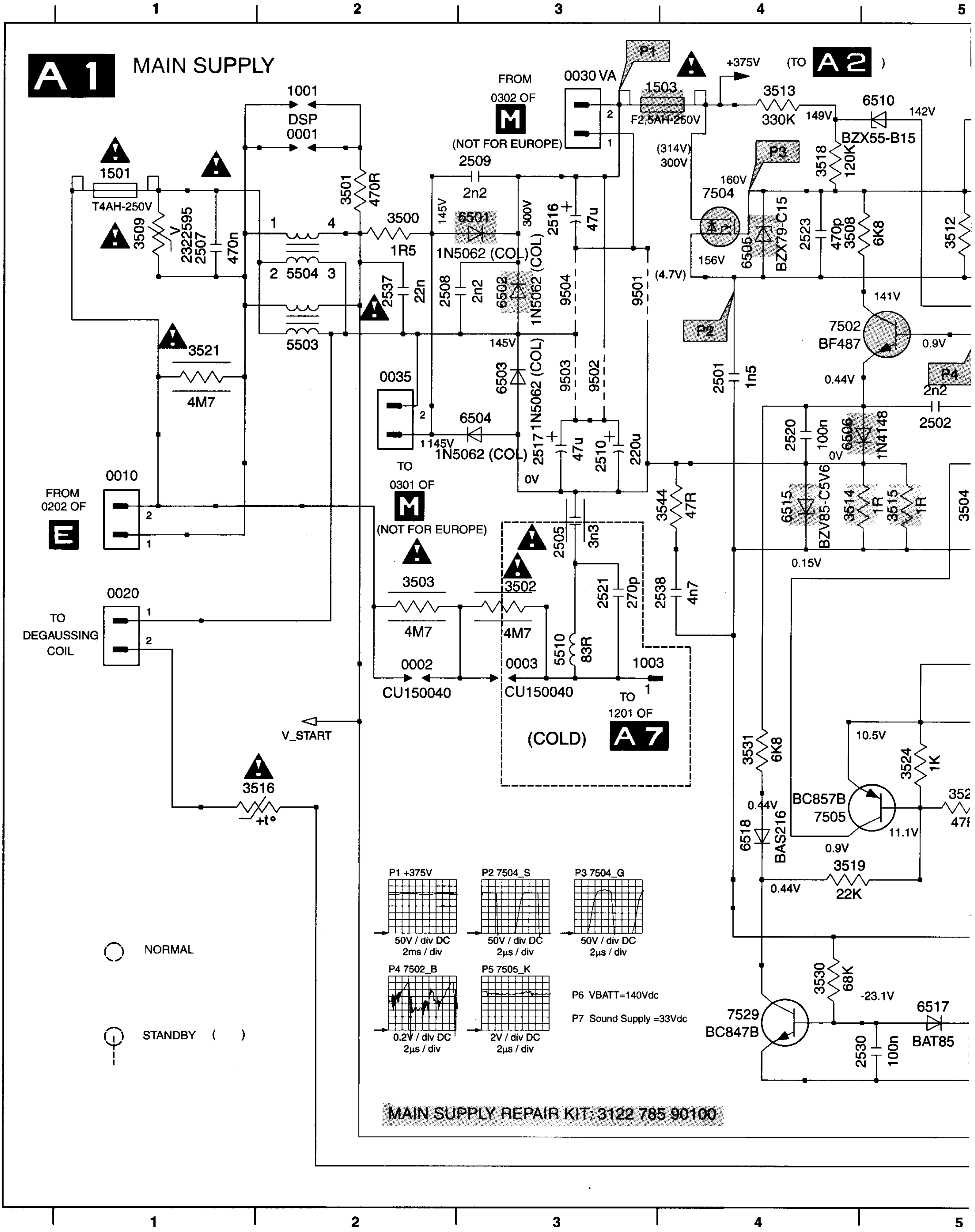
Testpoint overview CRT panel

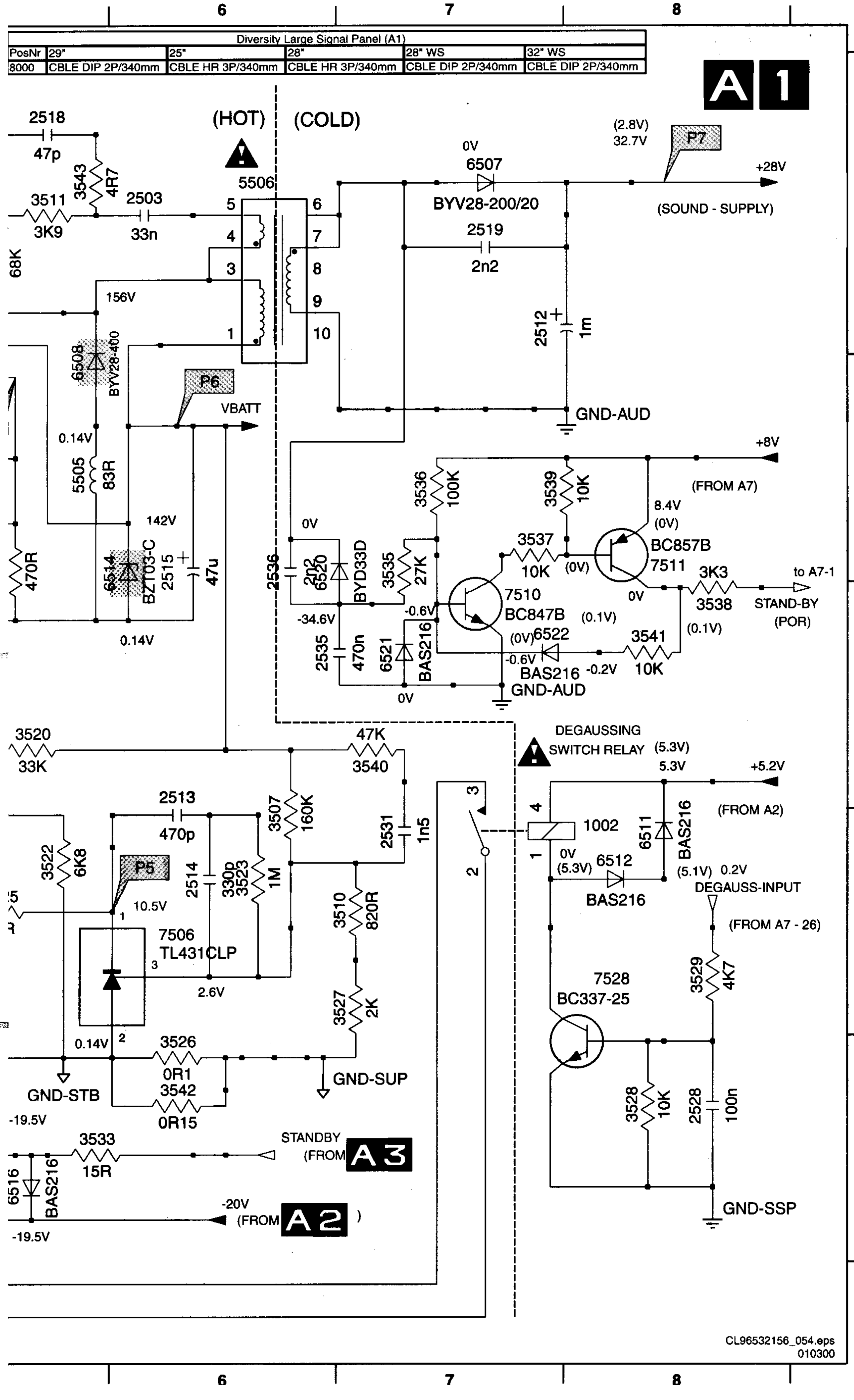

8
11
6
3306
3317
3310

CL 96532156_087.eps
280200

7. Schematics and PWB's

Main supply


A1 MAIN SUPPLY
1 2 3 4 5
1001 DSP 0001
1501 T4AH-250V
3509 V 2322595
2507 470n
3501 470R
3500 1R5
5504 1 4 2 3
5503
2537 22n
3521 4M7
2509 2n2
6501 1N5062 (COL)
6502 1N5062 (COL)
6503 1N5062 (COL)
6504 1N5062 (COL)
2508 2n2
2516 47u
2517 47u
2510 220u
9504 9503 9502 9501
145V 300V 145V 0V
FROM 0302 OF M (NOT FOR EUROPE)
0030 VA
1503 F2,5AH-250V
P1 +375V (TO A2)
(314V) 300V
3513 330K 149V
6510 BZX55-B15 142V
3518 120K
P3 160V 7504 156V
6505 BZX79-C15
2523 470p
3508 6K8
3512
(4.7V) P2
141V 7502 BF487 0.9V
0.44V P4 2n2 2502
2501 1n5
2520 100n
6506 1N4148 0V
6515 BZV85-C5V6
3514 1R
3515 1R
3504
3544 47R
0.15V
2538 4n7
0035 TO 0301 OF M (NOT FOR EUROPE)
1 145V
FROM 0202 OF E 0010
0020 TO DEGAUSSING COIL
2505 3n3
2521 270p
3503 4M7
3502 4M7
5510 83R
0002 CU150040
0003 CU150040
1003 TO 1201 OF A7
(COLD)
V_START
3516 +t°
3531 6K8
0.44V 6518 BAS216
BC857B 7505 10.5V 11.1V 0.9V
3524 1K
352 47
3519 22K 0.44V
3530 68K -23.1V
7529 BC847B
6517 BAT85
2530 100n
P1 +375V 50V / div DC 2ms / div
P2 7504_S 50V / div DC 2µs / div
P3 7504_G 50V / div DC 2µs / div
P4 7502_B 0.2V / div DC 2µs / div
P5 7505_K 2V / div DC 2µs / div
P6 VBATT=140Vdc
P7 Sound Supply =33Vdc
NORMAL
STANDBY ( )
MAIN SUPPLY REPAIR KIT: 3122 785 90100


6
7
8
A1
2518
47p
3543
4R7
3511
3K9
2503
33n
68K
(HOT)
(COLD)
5506
5
4
3
1
6
7
8
9
10
156V
6508
BYV28-400
P6
VBATT
0.14V
5505
83R
142V
6514
BZT03-C
2515
47u
470R
0.14V
0V
6507
BYV28-200/20
(2.8V)
32.7V
P7
+28V
(SOUND - SUPPLY)
2519
2n2
2512
1m
GND-AUD
+8V
3536
100K
3539
10K
(FROM A7)
8.4V
(0V)
BC857B
7511
3537
10K
(0V)
0V
3K3
3538
to A7-1
STAND-BY
(POR)
0V
2536
2n2
6520
BYD33D
3535
27K
-0.6V
7510
BC847B
(0.1V)
-34.6V
2535
470n
6521
BAS216
(0V)6522
-0.6V
BAS216
-0.2V
3541
10K
(0.1V)
0V
GND-AUD
3520
33K
47K
3540
2531
1n5
DEGAUSSING
SWITCH RELAY
(5.3V)
5.3V
+5.2V
3
4
1002
6511
BAS216
(FROM A2)
1
2
0V
(5.3V)
6512
BAS216
(5.1V)
0.2V
DEGAUSS-INPUT
(FROM A7 - 26)
2513
470p
3507
160K
3522
6K8
P5
2514
330p
3523
1M
10.5V
7506
TL431CLP
3
2.6V
3510
820R
3527
2K
7528
BC337-25
3529
4K7
0.14V
2
3526
0R1
3542
0R15
GND-STB
GND-SUP
3528
10K
2528
100n
-19.5V
3533
15R
STANDBY
(FROM A3
6516
BAS216
-20V
(FROM A2)
-19.5V
GND-SSP
CL96532156_054.eps
010300

Diversity Large Signal Panel (A1)					
PosNr	29"	25"	28"	28" WS	32" WS
8000	CBLE DIP 2P/340mm	CBLE HR 3P/340mm	CBLE HR 3P/340mm	CBLE DIP 2P/340mm	CBLE DIP 2P/340mm

A

B

C

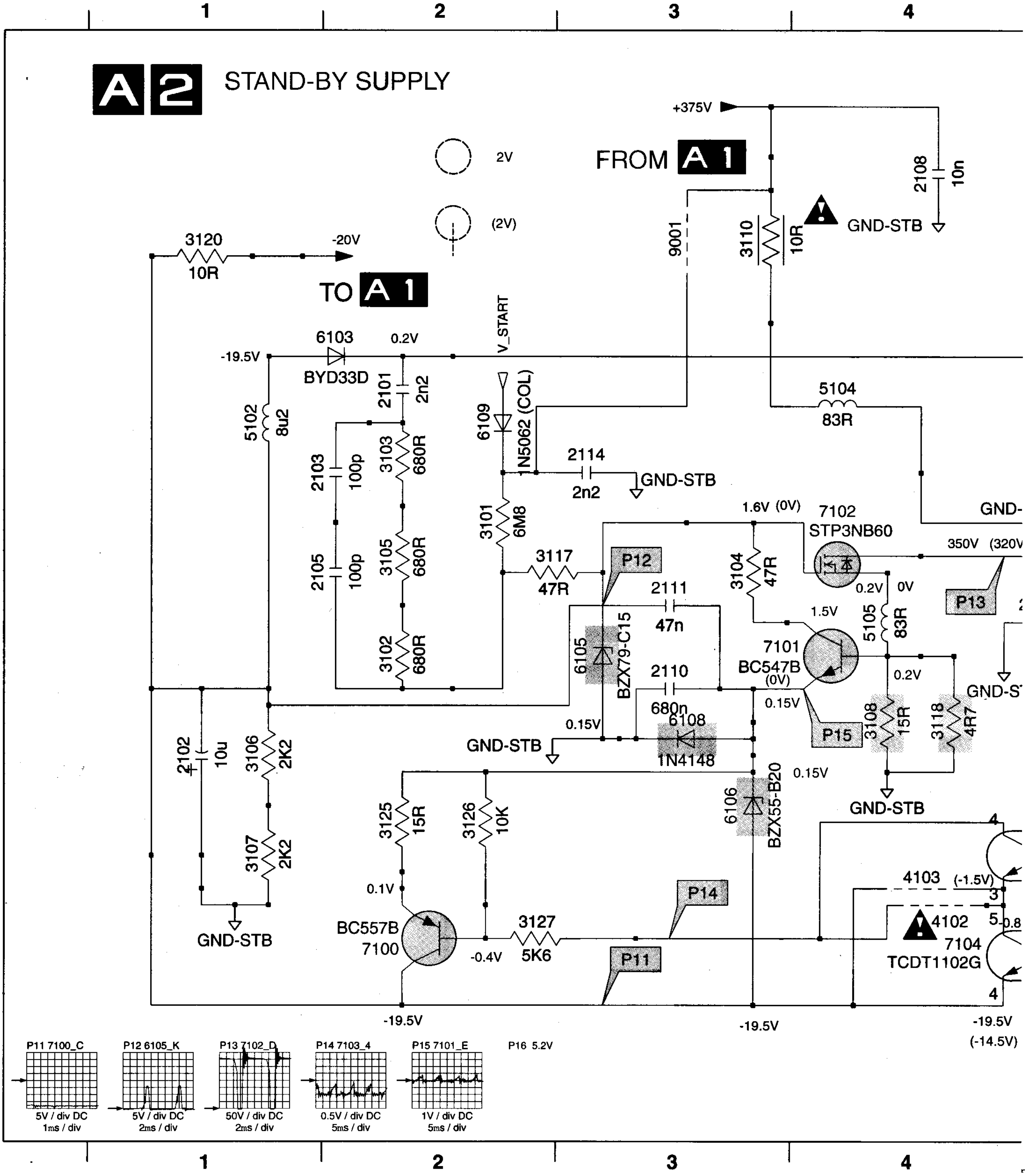
D

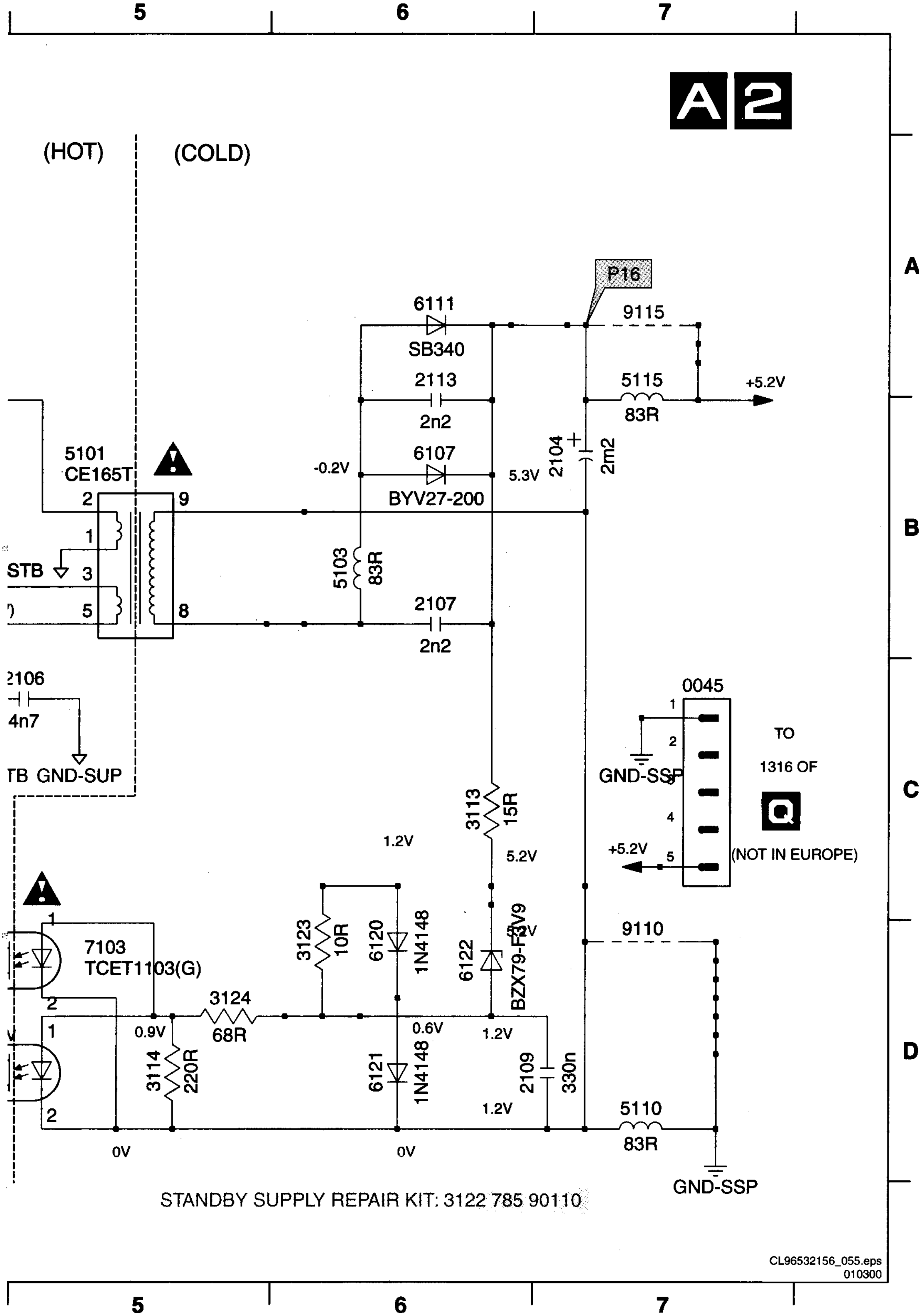
E

0001	A2
0002	C2
0003	C3
0010	B1
0020	C1
0030	A3
0035	B2
1001	A2
1002	D8
1003	C4
1501	A1
1503	A4
2501	B4
2502	B5
2503	A6
2505	C3
2507	A1
2508	A2
2509	A3
2510	B3
2512	A7
2513	C6
2514	D6
2515	B6
2516	A3
2517	B3
2518	A5
2519	A7
2520	B4
2521	C3
2523	A4
2528	E8
2530	E5
2531	D7
2535	C6
2536	B6
2537	A2
2538	C4
3500	A2
3501	A2
3502	C3
3503	C2
3504	B5
3507	D6
3508	A4
3509	A1
3510	D7
3511	A5
3512	A5
3513	A4
3514	B4
3515	B5
3516	D2
3518	A4
3519	D4
3520	C5
3521	B1
3522	D5
3523	D6
3524	D5
3525	D5
3526	E6
3527	D7
3528	E8
3529	D8
3530	E4
3531	D4
3533	E5
3535	B7
3536	B7
3537	B7
3538	C8
3539	B7
3540	C7
3541	C8
3542	E6
3543	A5
3544	B4
5503	B2
5504	A2
5505	B5
5506	A6
5510	C3
6501	A3
6502	A3
6503	B3
6504	B3
6505	A4
6506	B4
6507	A7
6508	B5
6510	A5
6511	D8
6512	D8
6514	B6
6515	B4
6516	E5
6517	E5
6518	D4
6520	B6
6521	C7
6522	C7
7502	B5
7504	A4
7505	D4
7506	D6
7510	C7
7511	B8
7528	D8
7529	E4
9501	A3
9502	B3
9503	B3
9504	A3

Standby supply

0045 C7
2101 B2
2102 C1
2103 B2
2104 B7
2105 B2
2106 C5
2107 B6
2108 A4
2109 D7
2110 C3
2111 C3
2113 A6
2114 B3
3101 B2
3102 C2
3103 B2
3104 B3
3105 B2
3106 C1
3107 D1
3108 C4
3110 A3
3113 C6
3114 D5
3117 B2
3118 C4
3120 A1
3123 D6
3124 D5
3125 D2
3126 D2
3127 D2
4102 D4
4103 D4
5101 B5
5102 B1
5103 B6
5104 B4
5105 C4
5110 D7
5115 A7
6103 A2
6105 C3
6106 C3
6107 B6
6108 C3
6109 B2
6111 A6
6120 D6
6121 D6
6122 D6
7100 D2
7101 C4
7102 B4
7103 D5
7104 D4
9001 A3
9110 D7

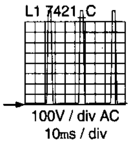

1
2
3
4
A2 STAND-BY SUPPLY
+375V
FROM A1
2V
(2V)
2108
10n
GND-STB
9001
3110
10R
3120
10R
-20V
TO A1
V_START
6103
BYD33D
0.2V
-19.5V
5102
8u2
2101
2n2
2103
100p
3103
680R
2105
100p
3105
680R
3102
680R
6109
1N5062 (COL)
2114
2n2
GND-STB
3101
6M8
3117
47R
5104
83R
1.6V (0V)
7102
STP3NB60
350V (320V
GND-
P12
2111
47n
3104
47R
0.2V
0V
P13
1.5V
5105
83R
6105
BZX79-C15
2110
680n
7101
BC547B
(0V)
0.2V
0.15V
P15
3108
15R
3118
4R7
GND-S
0.15V
6108
1N4148
GND-STB
2102
10u
3106
2K2
3107
2K2
GND-STB
3125
15R
3126
10K
6106
BZX55-B20
0.15V
GND-STB
0.1V
BC557B
7100
-0.4V
3127
5K6
P14
P11
4103
(-1.5V)
4102
7104
TCDT1102G
4
3
5
4
-19.5V
-19.5V
-19.5V
(-14.5V)
P11 7100_C
5V / div DC
1ms / div
P12 6105_K
5V / div DC
2ms / div
P13 7102_D
50V / div DC
2ms / div
P14 7103_4
0.5V / div DC
5ms / div
P15 7101_E
1V / div DC
5ms / div
P16 5.2V
1
2
3
4

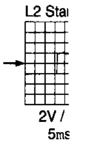

A2
(HOT)
(COLD)
5101
CE165T
2
9
1
STB
3
5
8
6111
SB340
2113
2n2
6107
BYV27-200
-0.2V
5.3V
5103
83R
2107
2n2
P16
9115
5115
83R
+5.2V
2104
2m2
2106
4n7
TB GND-SUP
0045
1
2
3
4
5
GND-SSP
TO
1316 OF
Q
(NOT IN EUROPE)
+5.2V
3113
15R
5.2V
1.2V
6122
BZX79-F5V9
5.2V
9110
7103
TCET1103(G)
1
2
3123
10R
6120
1N4148
3124
68R
0.9V
0.6V
1.2V
3114
220R
6121
1N4148
2109
330n
1.2V
5110
83R
0V
0V
GND-SSP
CL96532156_055.eps
010300
5
6
7
A
B
C
D

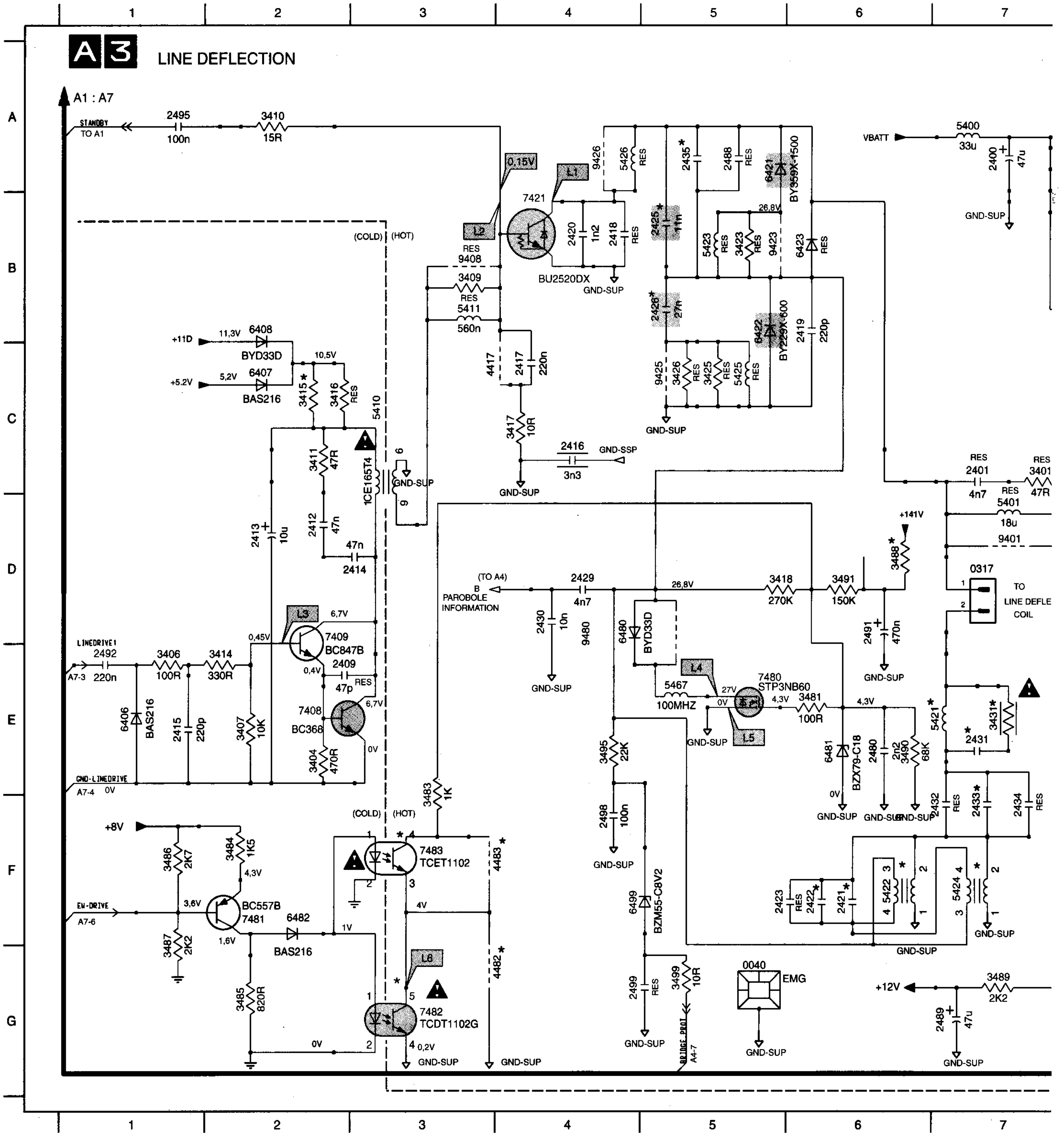
STANDBY SUPPLY REPAIR KIT: 3122 785 90110

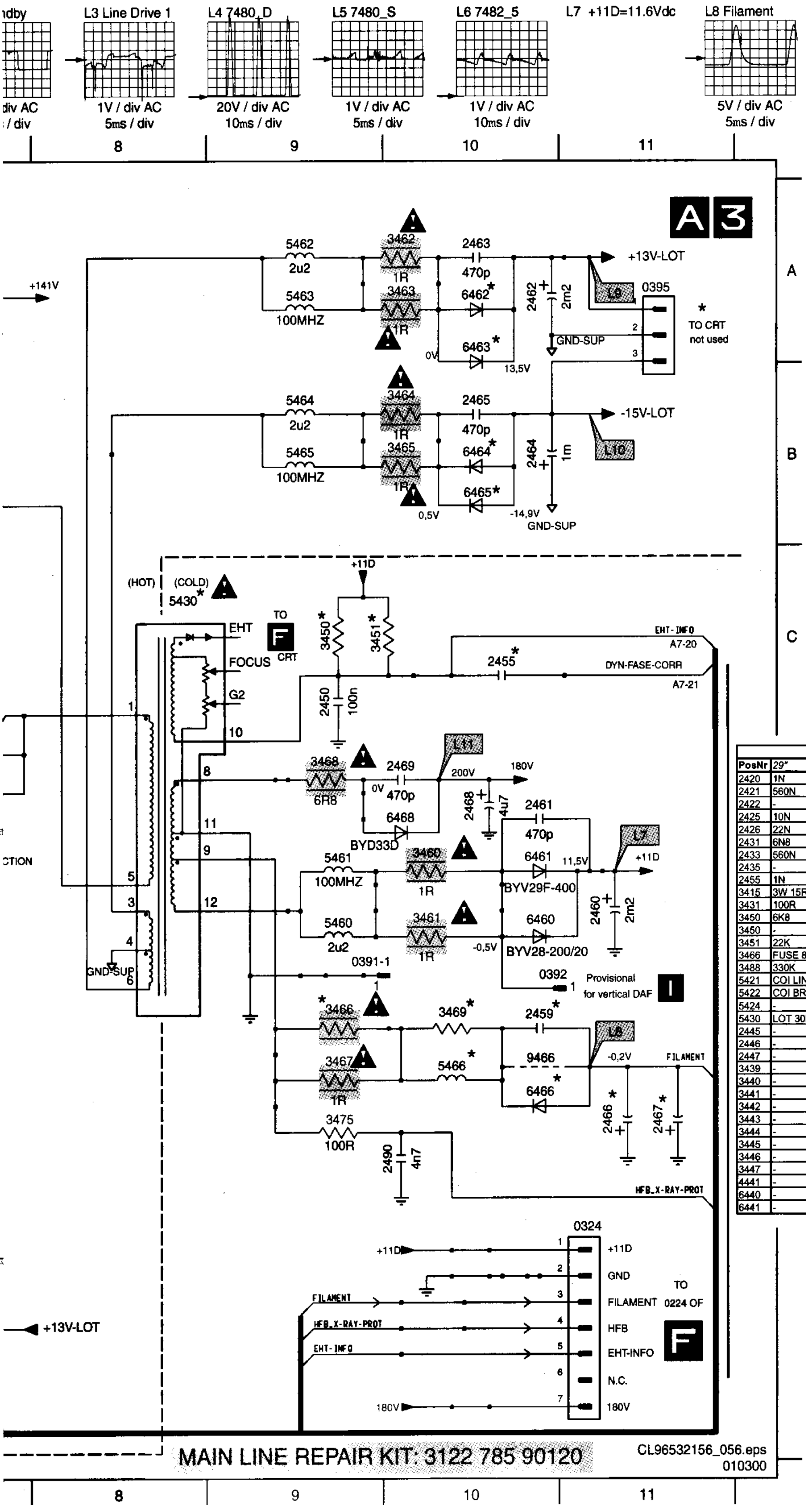
Line deflection

2400	A7
2401	C7
2409	E2
2412	D2
2413	D2
2414	D3
2421	F6
2422	F6
2423	F5
2425	B5
2426	B5
2429	D4
2450	C9
2455	C10
2459	E10
2460	D11
2461	D10
2462	A10
2469	D10
2480	E6
2488	A5
2489	G7
2490	F10
2491	D6
3406	E1
3407	E2
3409	B3
3410	A2
3411	C2
3414	E2
3426	C5
3431	E7
3450	C9
3451	C9
3460	D10
3461	E10
3468	D9
3469	E10
3475	F9
3481	E6
3483	F3
3484	F2
3491	D6
3495	E4
3499	G5
4417	C3
4482	G3
4483	F3
5423	B5
5424	F7
5425	C5
5426	A4
5430	C8
5460	E9
5467	E5
6406	E1
6407	C2
6408	B2
6421	A5
6422	B5
6465	B10
6466	F10
6468	D10
6480	D4
6481	E6
6482	F2
7482	G3
7483	F3
9401	D7
9408	B3
9423	B5
9425	C5






1
2
3
4
5
6
7
A
B
C
D
E
F
G
A3
LINE DEFLECTION
A1 : A7
STANDBY
TO A1
2495
100n
3410
15R
0,15V
L1
L2
7421
BU2520DX
GND-SUP
RES
9408
3409
RES
5411
560n
2420
1n2
2418
RES
9426
5426
RES
2435*
2488
RES
6421
BY359X-1500
2425*
11n
26,8V
5423
RES
3423
RES
9423
6423
RES
2426*
27n
6422
BY229X-600
2419
220p
9425
3426
RES
3425
RES
5425
RES
GND-SUP
(COLD)
(HOT)
+11D
11,3V
6408
BYD33D
+5.2V
5,2V
6407
BAS216
10,5V
3415*
3416
RES
5410
3411
47R
1CE165T4
6
9
GND-SUP
2413
10u
2412
47n
47n
2414
4417
2417
220n
3417
10R
2416
3n3
GND-SSP
GND-SUP
VBATT
5400
33u
2400
47u
GND-SUP
RES
2401
4n7
RES
3401
47R
RES
5401
18u
9401
+141V
3488*
0317
TO
LINE DEFLE
COIL
(TO A4)
B
PAROBOLE
INFORMATION
2429
4n7
2430
10n
9480
26,8V
3418
270K
3491
150K
2491
470n
GND-SUP
6480
BYD33D
L4
5467
100MHZ
27V
0V
7480
STP3NB60
4,3V
3481
100R
4,3V
L5
GND-SUP
6481
BZX79-C18
0V
2480
2n2
3490
68K
GND-SUP
GND-SUB
GND-SUP
5421*
3431*
2431*
2432
RES
2433*
2434
RES
L3
6,7V
0,45V
7409
BC847B
0,4V
2409
47p
RES
6,7V
7408
BC368
0V
LINEDRIVE1
2492
A7-3
220n
3406
100R
3414
330R
6406
BAS216
2415
220p
3407
10K
3404
470R
GND-LINEDRIVE
A7-4
0V
3483
1K
3495
22K
2498
100n
GND-SUP
(COLD)
(HOT)
+8V
3486
2K7
3484
1K5
4,3V
EW-DRIVE
A7-6
3,6V
BC557B
7481
6482
BAS216
1,6V
1V
3487
2K2
3485
820R
1
2
4
3
7483
TCET1102
4V
4483*
4482*
L6
5
7482
TCDT1102G
0V
4
0,2V
GND-SUP
GND-SUP
6499
BZM55-C8V2
2499
RES
GND-SUP
3499
10R
BRIDGE PROT
A4-7
0040
EMG
GND-SUP
2423
RES
2422*
2421*
5422
3
4
2
1
5424
3
4
2
1
GND-SUP
GND-SUP
+12V
3489
2K2
2489
47u
GND-SUP


dby
L3 Line Drive 1
L4 7480_D
L5 7480_S
L6 7482_5
L7 +11D=11.6Vdc
L8 Filament
L9 +13V_Lot
L10 -15V_Lot
L11 180Vdc
div AC
/ div
1V / div AC
5ms / div
20V / div AC
10ms / div
1V / div AC
5ms / div
1V / div AC
10ms / div
5V / div AC
5ms / div
2V / div AC
5ms / div
2V / div AC
5ms / div
8
9
10
11
A3
A
B
C
+141V
5462
2u2
5463
100MHZ
3462
1R
3463
1R
2463
470p
6462*
6463*
0V
13,5V
2462
2m2
+13V-LOT
L9
0395
2
3
GND-SUP
TO CRT
not used
5464
2u2
5465
100MHZ
3464
1R
3465
1R
2465
470p
6464*
6465*
0,5V
-14,9V
2464
1m
GND-SUP
-15V-LOT
L10
(HOT)
(COLD)
5430*
+11D
EHT
FOCUS
G2
TO
F
CRT
3450*
3451*
EHT-INFO
A7-20
2455*
DYN-FASE-CORR
A7-21
2450
100n
1
10
8
11
9
12
5
3
4
6
GND-SUP
CTION
3468
6R8
2469
470p
0V
200V
180V
L11
2468
4u7
6468
BYD33D
2461
470p
L7
5461
100MHZ
3460
1R
6461
11,5V
+11D
BYV29F-400
2460
2m2
5460
2u2
3461
1R
6460
-0,5V
BYV28-200/20
0391-1
0392
1
Provisional
for vertical DAF
I
*3466
3469*
2459*
L8
3467
1R
5466*
9466
-0,2V
FILAMENT
6466*
2466*
2467*
3475
100R
2490
4n7
HFB_X-RAY-PROT
0324
+11D
GND
FILAMENT
HFB
EHT-INFO
N.C.
180V
1
2
3
4
5
6
7
FILAMENT
HFB_X-RAY-PROT
EHT-INFO
180V
TO
0224 OF
F
+13V-LOT

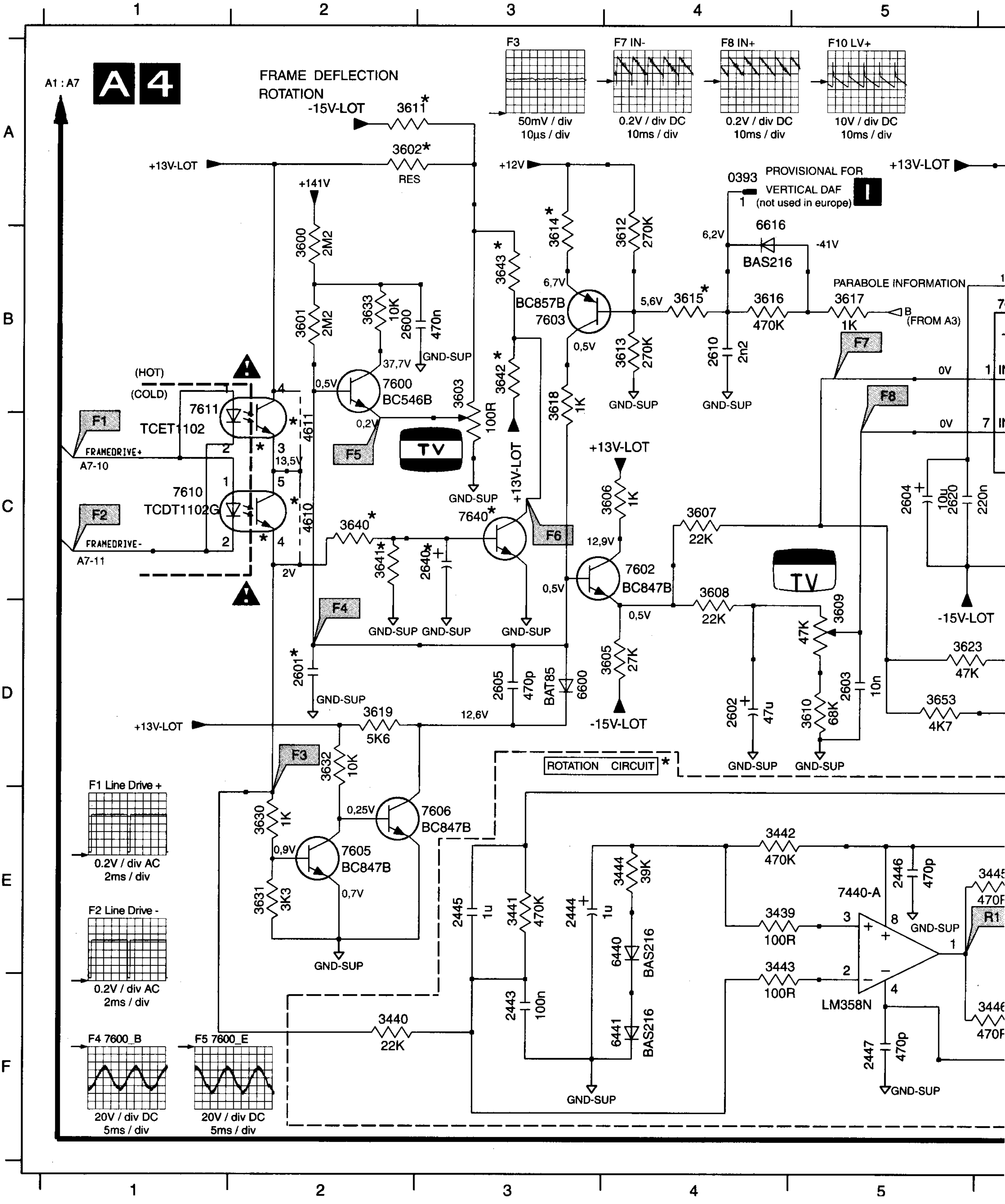
MAIN LINE REPAIR KIT: 3122 785 90120

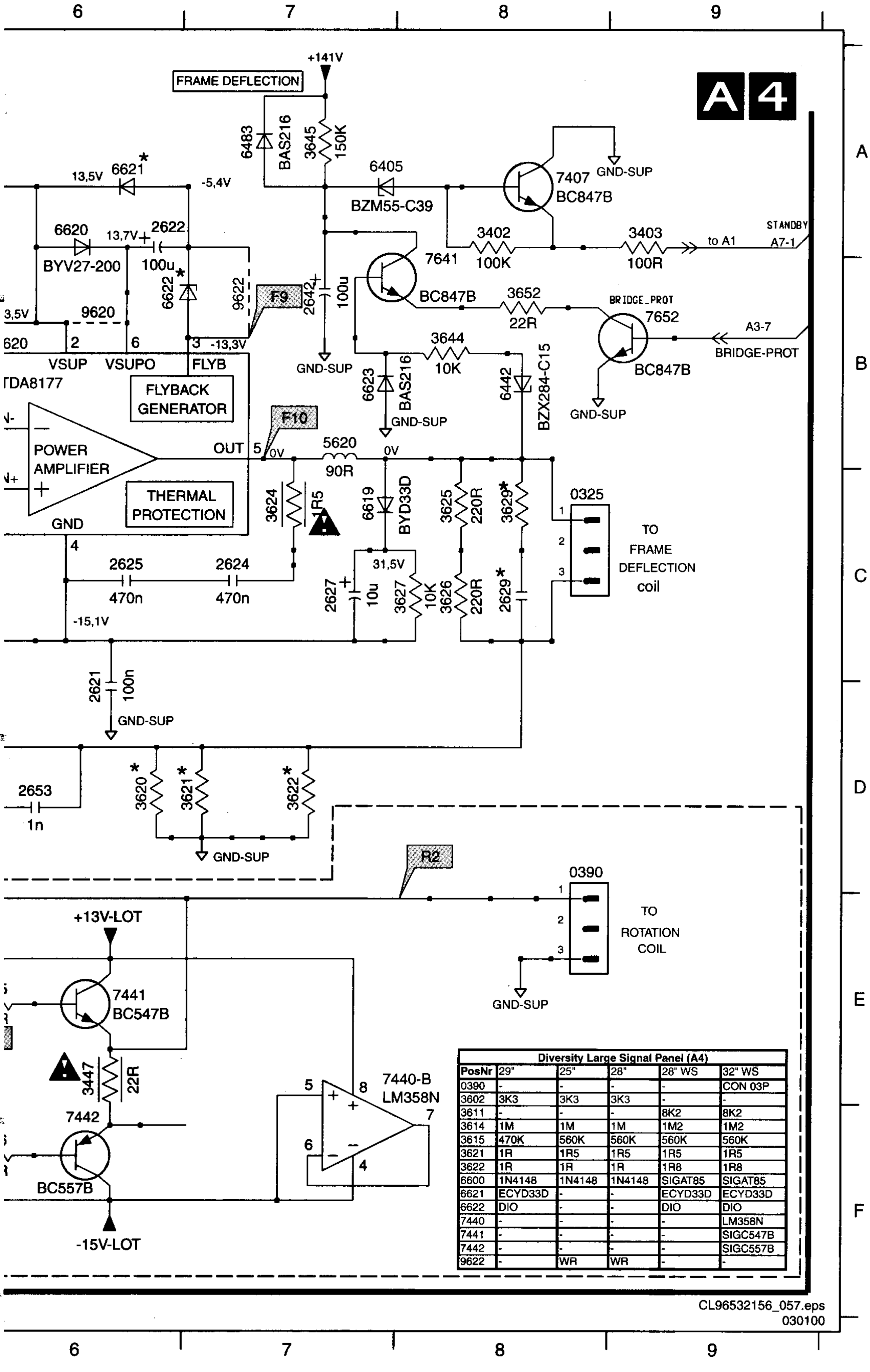
CL96532156_056.eps
010300

Diversity Large Signal Panel (A3)

PosNr	*29"*	*25"*	*28"*	*28" WS*	*32" WS*
2420	1N	1N	1N	560P	1N
2421	560N	560N	470N	-	-
2422	-	-	-	21U2	21U2
2425	10N	9N1	-	11N	11N
2426	22N	24N	24N	24N	24N
2431	6N8	3N3	3N3	3N3	3N3
2433	560N	390N	470N	390N	430N
2435	-	-	9N1	-	-
2455	1N	-	-	3N3	3N3
3415	3W 15R	3W 15R	3W 15R	PR03 12R	PR03 12R
3431	100R	220R	220R	220R	220R
3450	6K8	-	-	10K	10K
3450	-	8K2	8K2	-	-
3451	22K	22K	22K	10K	10K
3466	FUSE 8R2	6R8	FUSE 8R2	1R	1R
3488	330K	220K	220K	220K	120K
5421	COI LINCOR DRUM	COI LINCOR DC12 8MH	COI LINCOR DRUM	COI LINCOR DRUM	COI LINCOR DRUM
5422	COI BRIDGE	-	-	COI BRIDGE	COI BRIDGE
5424	-	COI BRIDGE	COI BRIDGE	-	-
5430	LOT 30KV ISO ELDOR	LOT PWRSL. 27K5	LOT PWRSL. 27K5	LOT PWRSL. 30KV	LOT PWRSL. 30KV
2445	-	-	-	-	1U
2446	-	-	-	-	470P
2447	-	-	-	-	470P
3439	-	-	-	-	100R
3440	-	-	-	-	22K
3441	-	-	-	-	470K
3442	-	-	-	-	470K
3443	-	-	-	-	100R
3444	-	-	-	-	39K
3445	-	-	-	-	2K2
3446	-	-	-	-	2K2
3447	-	-	-	-	22R
4441	-	-	-	-	JUMP
6440	-	-	-	-	SMAS216
6441	-	-	-	-	SMAS216

Frame deflection

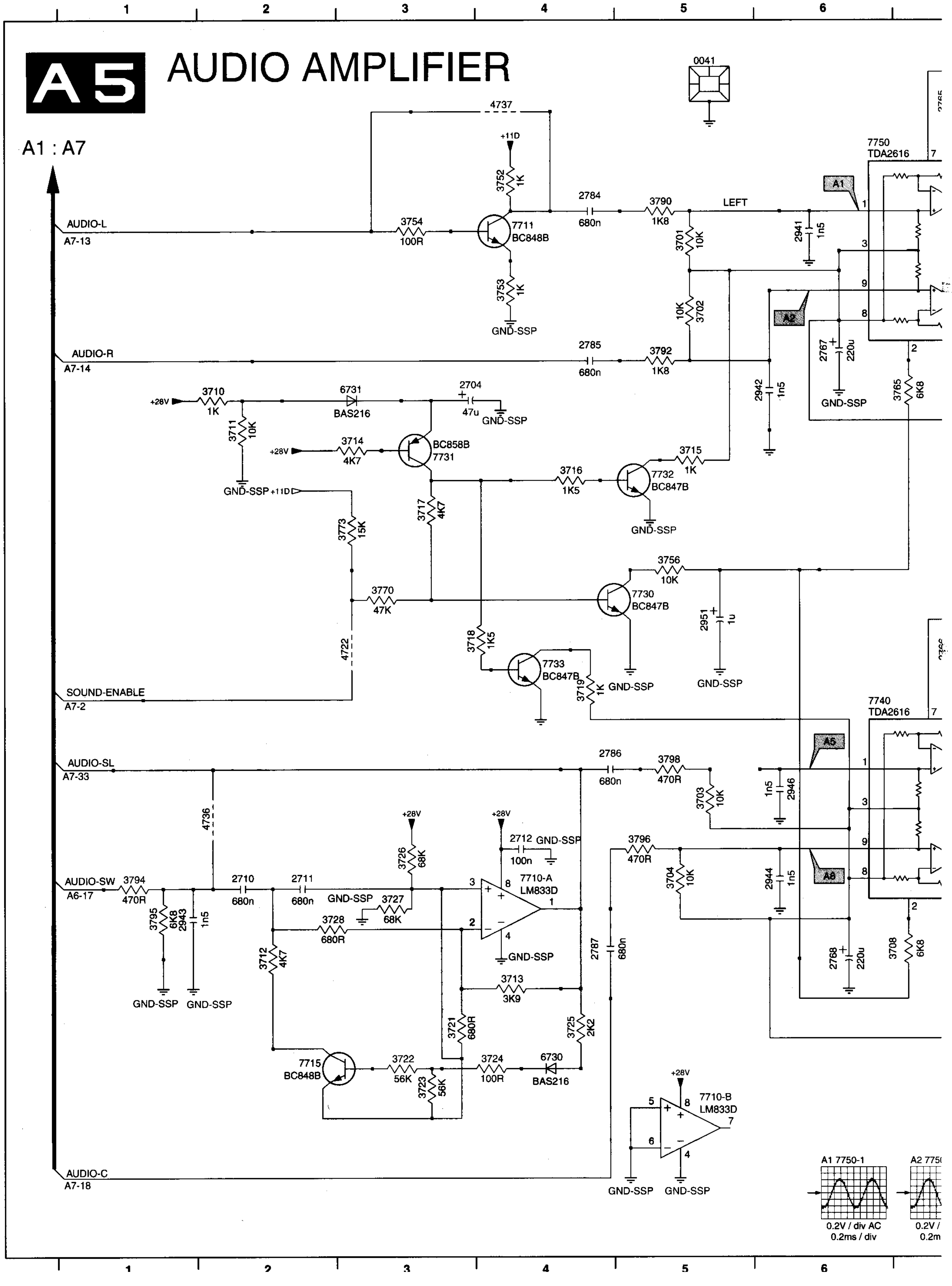

A4
A1 : A7
FRAME DEFLECTION
ROTATION
-15V-LOT
3611*
3602*
RES
+13V-LOT
+141V
3600 2M2
3601 2M2
3633 10K
2600 470n
GND-SUP
37,7V
0,5V
7600
BC546B
0,2V
3603 100R
3643*
3642*
+13V-LOT
+12V
3614*
6,7V
BC857B
7603
0,5V
3618 1K
3612 270K
3613 270K
5,6V
3615*
3616 470K
6,2V
0393
1
PROVISIONAL FOR
VERTICAL DAF
(not used in europe)
I
6616
BAS216
-41V
PARABOLE INFORMATION
3617 1K
B (FROM A3)
2610 2n2
F3
50mV / div
10µs / div
F7 IN-
0.2V / div DC
10ms / div
F8 IN+
0.2V / div DC
10ms / div
F10 LV+
10V / div DC
10ms / div
(HOT)
(COLD)
7611
TCET1102
7610
TCDT1102G
F1
FRAMEDRIVE+
A7-10
F2
FRAMEDRIVE-
A7-11
4611
4610
13,5V
2V
F5
TV
GND-SUP
7640*
F6
3640*
3641*
2640*
F4
2601*
3619 5K6
12,6V
2605 470p
BAT85
6600
+13V-LOT
3606 1K
12,9V
7602
BC847B
0,5V
3605 27K
-15V-LOT
3607 22K
3608 22K
3609 47K
2602 47u
3610 68K
2603 10n
0V
1
7
F7
F8
2604 10u
2620 220n
-15V-LOT
3623 47K
3653 4K7
ROTATION CIRCUIT *
F3
3632 10K
3630 1K
3631 3K3
0,25V
0,9V
0,7V
7606
BC847B
7605
BC847B
2445 1u
3441 470K
2443 100n
2444 1u
3444 39K
6440 BAS216
6441 BAS216
3440 22K
3442 470K
3439 100R
3443 100R
7440-A
LM358N
2446 470p
2447 470p
3445 470R
3446 470R
R1
F1 Line Drive +
0.2V / div AC
2ms / div
F2 Line Drive -
0.2V / div AC
2ms / div
F4 7600_B
20V / div DC
5ms / div
F5 7600_E
20V / div DC
5ms / div
1 2 3 4 5
A B C D E F

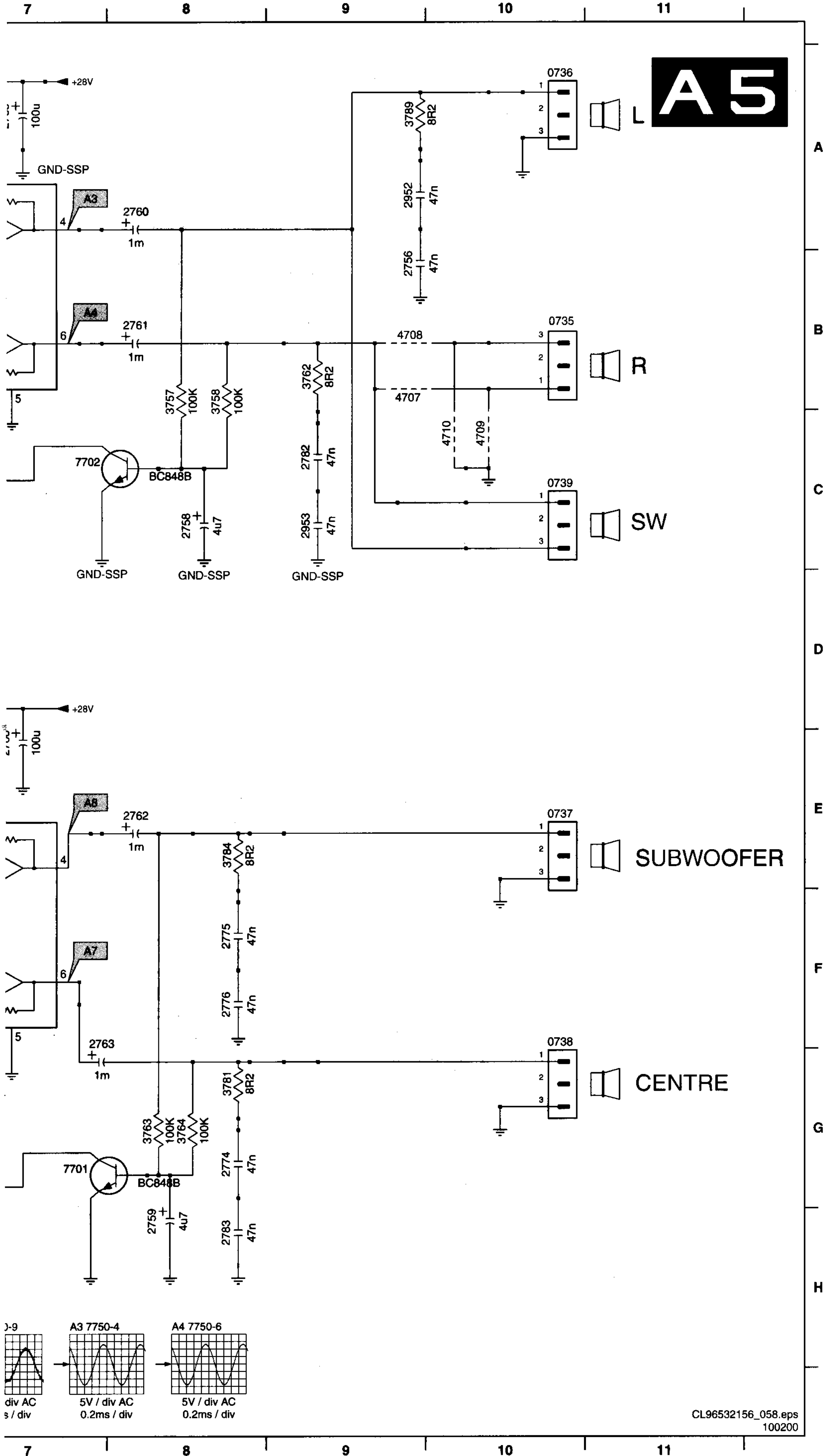

A4
6
7
8
9
A
B
C
D
E
F
FRAME DEFLECTION
+141V
6483
BAS216
3645
150K
6621
13,5V
-5,4V
6405
BZM55-C39
7407
BC847B
GND-SUP
6620
BYV27-200
13,7V
2622
100u
6622
9622
F9
2642
100u
7641
BC847B
3402
100K
3403
100R
to A1
STANDBY
A7-1
3652
22R
BRIDGE_PROT
7652
BC847B
A3-7
BRIDGE-PROT
3,5V
9620
620
2
6
3
-13,3V
VSUP
VSUPO
FLYB
TDA8177
FLYBACK GENERATOR
3644
10K
6623
BAS216
6442
BZX284-C15
POWER AMPLIFIER
OUT
5
0V
F10
5620
90R
0V
THERMAL PROTECTION
GND
4
3624
1R5
6619
BYD33D
3625
220R
3629
0325
1
2
3
TO FRAME DEFLECTION coil
2625
470n
2624
470n
31,5V
2627
10u
3627
10K
3626
220R
2629
-15,1V
2621
100n
2653
1n
3620
3621
3622
R2
0390
TO ROTATION COIL
+13V-LOT
7441
BC547B
3447
22R
7442
BC557B
-15V-LOT
7440-B
LM358N
5
8
7
6
4
CL96532156_057.eps
030100

Diversity Large Signal Panel (A4)					
PosNr	29"	25"	28"	28" WS	32" WS
0390	-	-	-	-	CON 03P
3602	3K3	3K3	3K3	-	-
3611	-	-	-	8K2	8K2
3614	1M	1M	1M	1M2	1M2
3615	470K	560K	560K	560K	560K
3621	1R	1R5	1R5	1R5	1R5
3622	1R	1R	1R	1R8	1R8
6600	1N4148	1N4148	1N4148	SIGAT85	SIGAT85
6621	ECYD33D	-	-	ECYD33D	ECYD33D
6622	DIO	-	-	DIO	DIO
7440	-	-	-	-	LM358N
7441	-	-	-	-	SIGC547B
7442	-	-	-	-	SIGC557B
9622	-	WR	WR	-	-

0325	C8
0390	D8
0393	A4
2443	F3
2444	E3
2445	E3
2446	E5
2447	F5
2600	B2
2601	D2
2602	D4
2603	D5
2604	C5
2605	D3
2610	B4
2620	C5
2621	D6
2622	A6
2624	C7
2625	C6
2627	C7
2629	C8
2640	C3
2642	B7
2653	D6
3402	A8
3403	A9
3439	E4
3440	F2
3441	E3
3442	E4
3443	E4
3444	E4
3445	E6
3446	F6
3447	E6
3600	B2
3601	B2
3602	A2
3603	B3
3605	D4
3606	C4
3607	C4
3608	C4
3609	D5
3610	D5
3611	A2
3612	B4
3613	B4
3614	B3
3615	B4
3616	B4
3617	B5
3618	B3
3619	D2
3620	D6
3621	D7
3622	D7
3623	D5
3624	C7
3625	C8
3626	C8
3627	C8
3629	C8
3630	E2
3631	E2
3632	D2
3633	B2
3640	C2
3641	C2
3642	B3
3643	B3
3644	B8
3645	A7
3652	B8
3653	D5
4610	C2
4611	C2
5620	B7
6405	A7
6440	E4
6441	F4
6442	B8
6483	A7
6600	D3
6616	B4
6619	C7
6620	A6
6621	A6
6622	B6
6623	B7
7407	A8
7440-A	E5
7440-B	E7
7441	E6
7442	F6
7600	B2
7602	C4
7603	B3
7605	E2
7606	E3
7610	C1
7611	C1
7620	B6
7640	C3
7641	B8
7652	B9
9620	B6

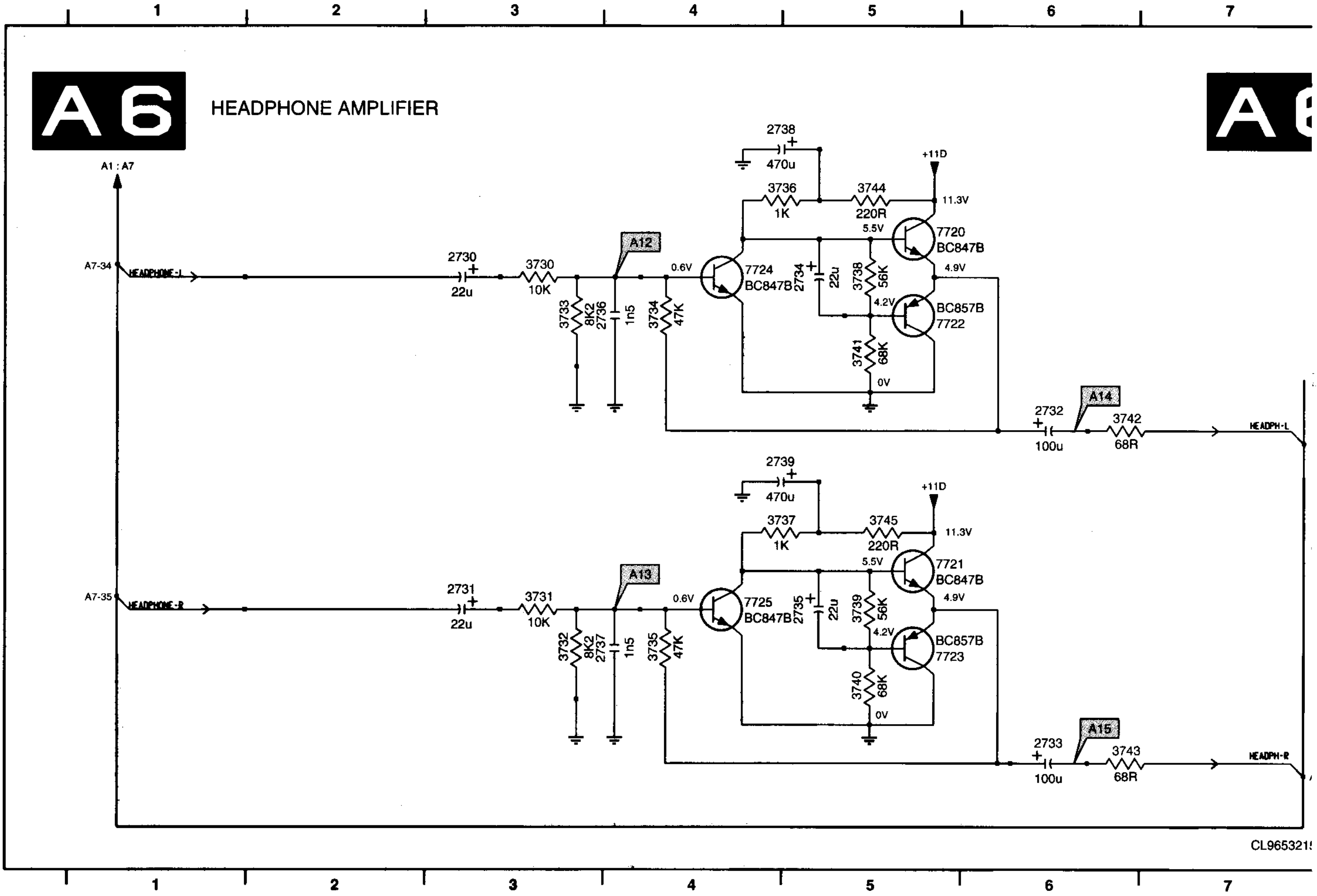
Audio amplifier


A5
AUDIO AMPLIFIER
A1 : A7
1
2
3
4
5
6
0041
4737
+11D
3752
1K
2784
680n
3790
1K8
LEFT
7750
TDA2616
A1
AUDIO-L
A7-13
3754
100R
7711
BC848B
2941
1n5
3701
10K
3753
1K
GND-SSP
3702
10K
A2
2767
220u
AUDIO-R
A7-14
2785
680n
3792
1K8
2942
1n5
3765
6K8
+28V
3710
1K
6731
BAS216
2704
47u
3711
10K
3714
4K7
BC858B
7731
3715
1K
3716
1K5
7732
BC847B
+11D
3717
4K7
3773
15K
3756
10K
3770
47K
7730
BC847B
2951
1u
3718
1K5
7733
BC847B
3719
1K
4722
SOUND-ENABLE
A7-2
7740
TDA2616
A5
AUDIO-SL
A7-33
2786
680n
3798
470R
2946
1n5
3703
10K
4736
3726
68K
2712
100n
3796
470R
A6
AUDIO-SW
A6-17
3794
470R
2710
680n
2711
680n
3727
68K
7710-A
LM833D
3704
10K
2944
1n5
3795
6K8
2943
1n5
3728
680R
3712
4K7
2787
680n
2768
220u
3708
6K8
3713
3K9
3721
680R
3725
2K2
7715
BC848B
3722
56K
3724
100R
6730
BAS216
3723
56K
7710-B
LM833D
AUDIO-C
A7-18
A1 7750-1
0.2V / div AC
0.2ms / div
A2 775
0.2V /
0.2m

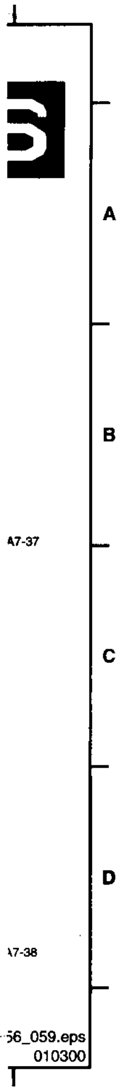

A5
7
8
9
10
11
A
B
C
D
E
F
G
H
+28V
100u
GND-SSP
A3
A4
A8
A7
4
6
5
2760
1m
2761
1m
2762
1m
2763
1m
0736
L
0735
R
0739
SW
0737
SUBWOOFER
0738
CENTRE
1
2
3
3789
8R2
2952
47n
2756
47n
4708
4707
4710
4709
3762
8R2
2782
47n
2953
47n
3757
100K
3758
100K
7702
BC848B
2758
4u7
3784
8R2
2775
47n
2776
47n
3781
8R2
2774
47n
2783
47n
3763
100K
3764
100K
7701
BC848B
2759
4u7
0-9
div AC
s / div
A3 7750-4
5V / div AC
0.2ms / div
A4 7750-6
5V / div AC
0.2ms / div
CL96532156_058.eps
100200

0041	A5
0735	B10
0736	A10
0737	E10
0738	F10
0739	C10
2704	C3
2710	F2
2711	F2
2712	F4
2756	B9
2758	C8
2759	H8
2760	A8
2761	B8
2762	E8
2763	F7
2765	A7
2766	E7
2767	B6
2768	G6
2774	G8
2775	F8
2776	F8
2782	C9
2783	H8
2784	A4
2785	B4
2786	E4
2787	G4
2941	B6
2942	C6
2943	G1
2944	F6
2946	F6
2951	D5
2952	A9
2953	C9
3701	B5
3702	B5
3703	F5
3704	F5
3708	G7
3710	C2
3711	C2
3712	G2
3713	G4
3714	C3
3715	C5
3716	C4
3717	D3
3718	E3
3719	E4
3721	G3
3722	H3
3723	H3
3724	H4
3725	G4
3726	F3
3727	F3
3728	G2
3752	A4
3753	B4
3754	B3
3756	D5
3757	B8
3758	B8
3762	B9
3763	G8
3764	G8
3765	C7
3770	D3
3773	D3
3781	G8
3784	E8
3789	A9
3790	A5
3792	B5
3794	F1
3795	G1
3796	F5
3798	E5
4707	B9
4708	B9
4709	C10
4710	C10
4722	E3
4736	F2
4737	A4
6730	H4
6731	C3
7701	G7
7702	C7
7710-A	F4
7710-B	H5
7711	B4
7715	H2
7730	D5
7731	C3
7732	C5
7733	E4
7740	E6
7750	A6

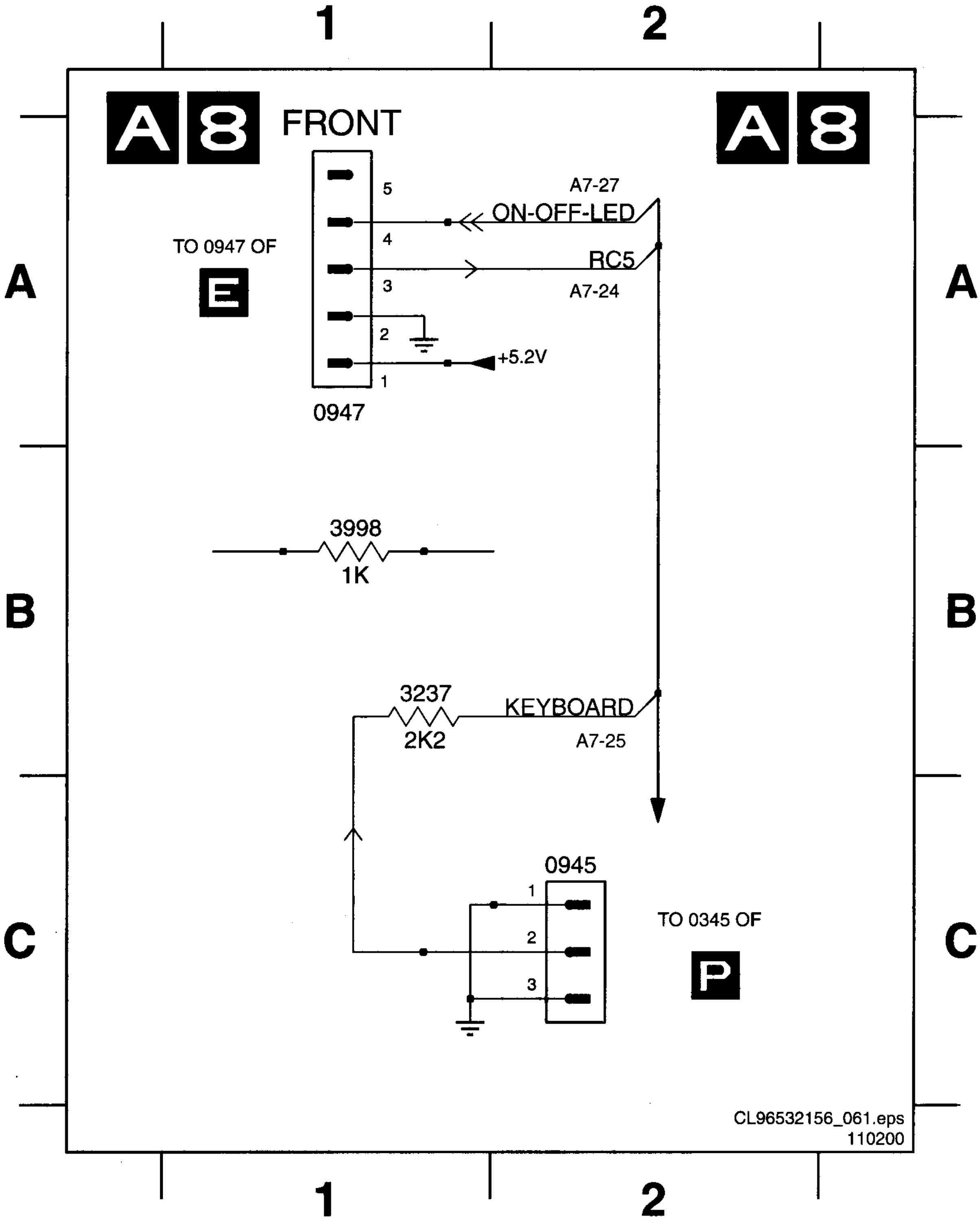
Headphone amplifier


1
2
3
4
5
6
7
A6
HEADPHONE AMPLIFIER
A6
A1 : A7
A7-34
HEADPHONE-L
A7-35
HEADPHONE-R
2730
22u
3730
10K
3733
8K2
2736
1n5
3734
47K
A12
0.6V
7724
BC847B
2734
22u
3738
56K
4.2V
3741
68K
0V
2738
470u
3736
1K
3744
220R
+11D
11.3V
5.5V
7720
BC847B
4.9V
BC857B
7722
2732
100u
A14
3742
68R
HEADPH-L
2731
22u
3731
10K
3732
8K2
2737
1n5
3735
47K
A13
0.6V
7725
BC847B
2735
22u
3739
56K
4.2V
3740
68K
0V
2739
470u
3737
1K
3745
220R
+11D
11.3V
5.5V
7721
BC847B
4.9V
BC857B
7723
2733
100u
A15
3743
68R
HEADPH-R
CL965321
1
2
3
4
5
6
7

Front

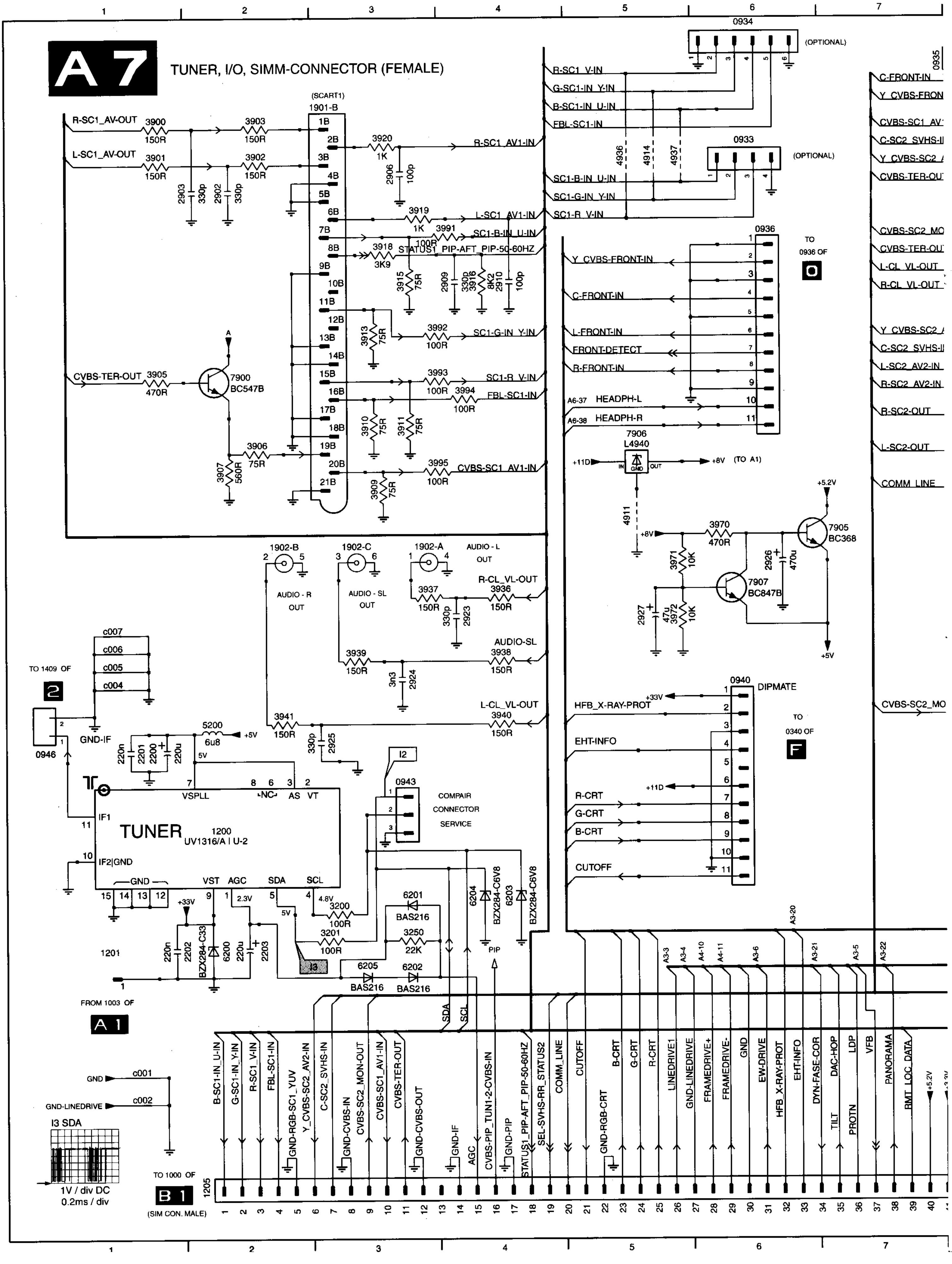

A
B
C
D
A7-37
A7-38
56_059.eps
010300

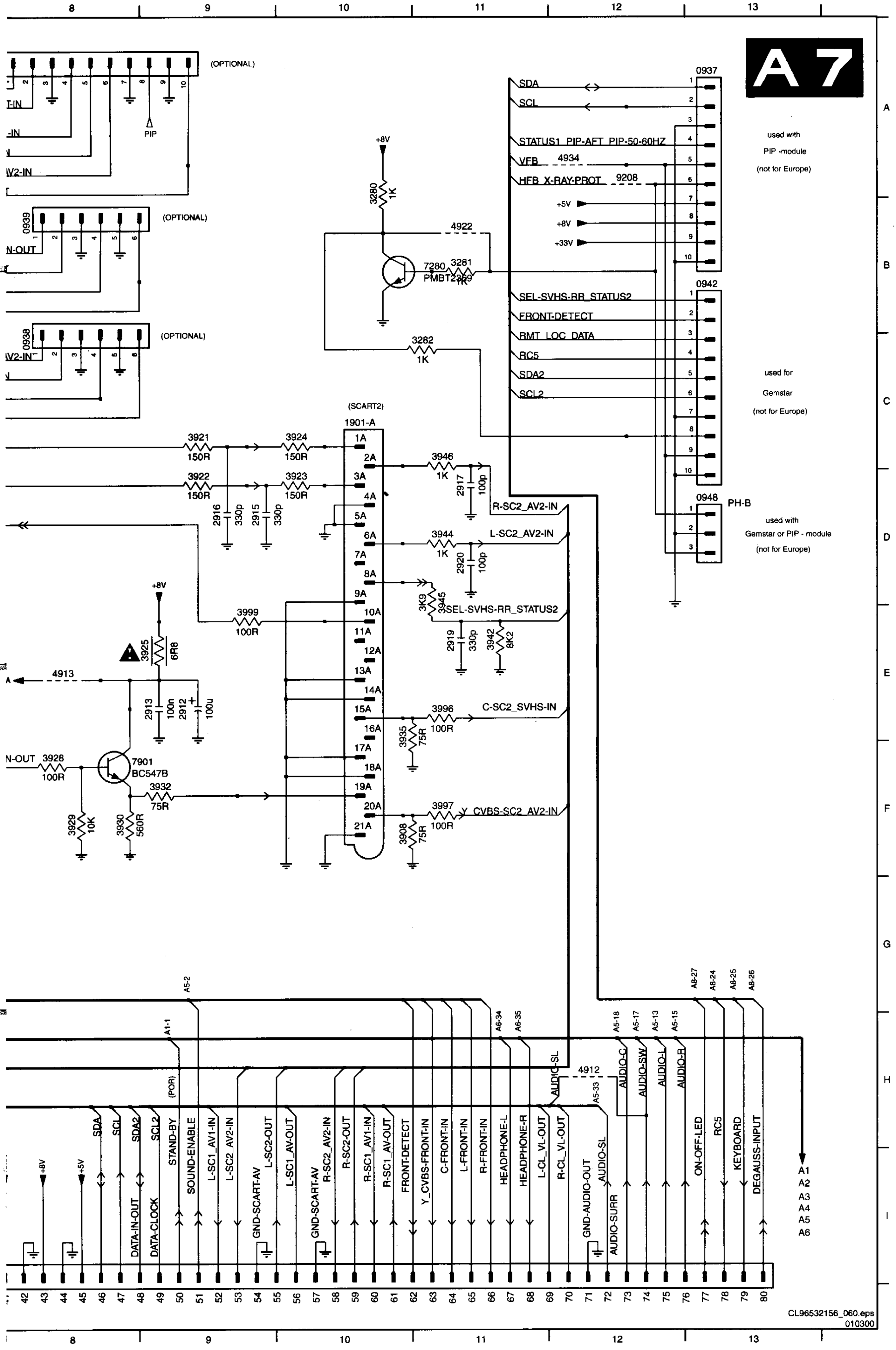
2730	A3
2731	C3
2732	B6
2733	D6
2734	B5
2735	C5
2736	B4
2737	D4
2738	A4
2739	C4
3730	B3
3731	C3
3732	D3
3733	B3
3734	B4
3735	D4
3736	A4
3737	C4
3738	B5
3739	C5
3740	D5
3741	B5
3742	B6
3743	D6
3744	A5
3745	C5
7720	A5
7721	C5
7722	B5
7723	D5
7724	B4
7725	C4


1
2
A
B
C
A8
FRONT
A8
TO 0947 OF
E
5
4
3
2
1
0947
A7-27
ON-OFF-LED
RC5
A7-24
+5.2V
3998
1K
3237
2K2
KEYBOARD
A7-25
0945
1
2
3
TO 0345 OF
P
CL96532156_061.eps
110200

0947	A1
3237	B1
3998	B1

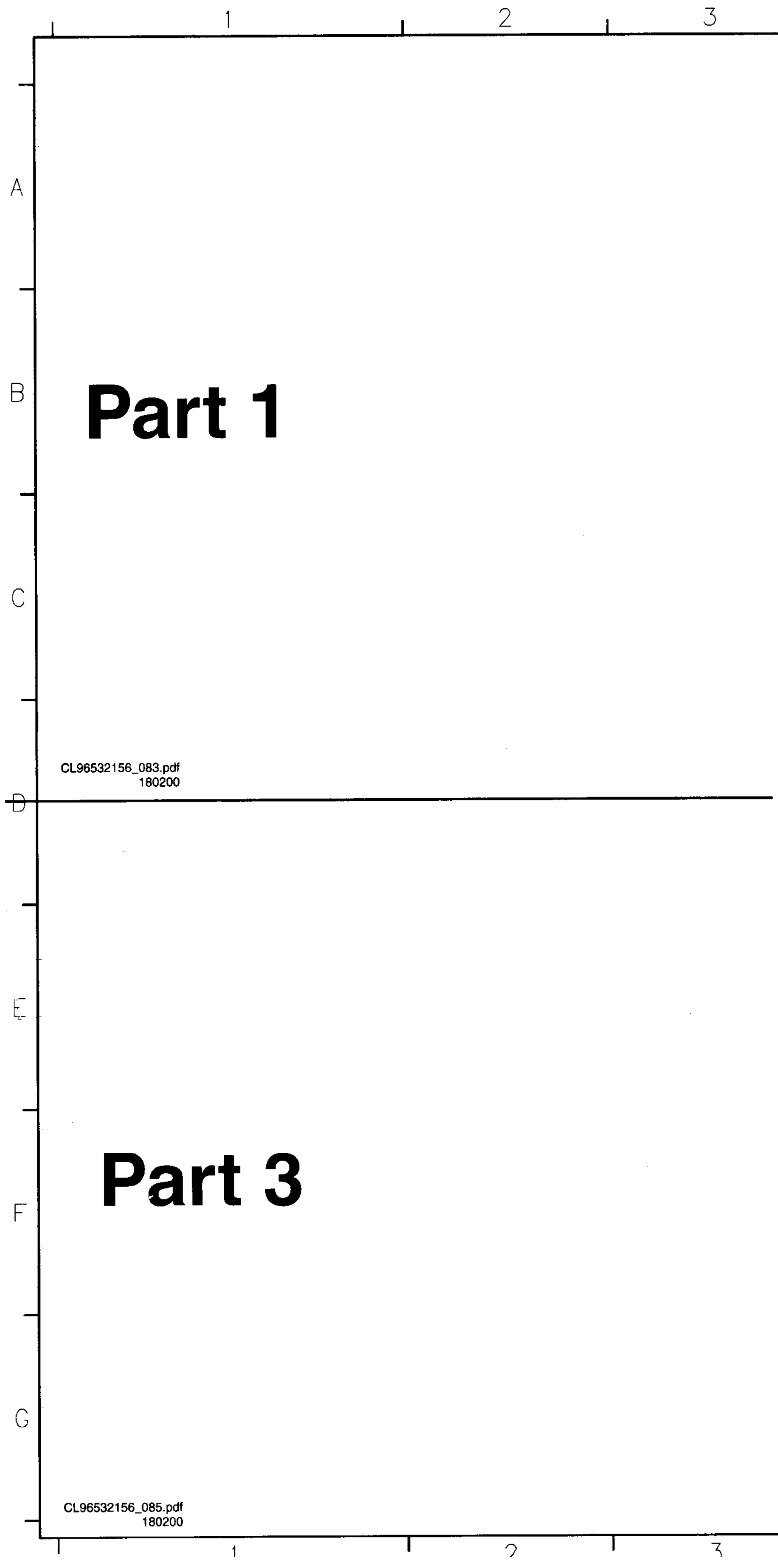
Tuner, I/O, Simm connector (female)


A 7
TUNER, I/O, SIMM-CONNECTOR (FEMALE)
(SCART1)
1901-B
R-SC1_AV-OUT
L-SC1_AV-OUT
3900 150R
3901 150R
3903 150R
3902 150R
2903 330p
2902 330p
3920 1K
2906 100p
R-SC1_AV1-IN
3919 1K
L-SC1_AV1-IN
3991 100R
SC1-B-IN_U-IN
3918 3K9
STATUS1_PIP-AFT_PIP-50-60HZ
3915 75R
2909 330p
3916 8K2
2910 100p
3913 75R
3992 100R
SC1-G-IN_Y-IN
3993 100R
SC1-R_V-IN
3994 100R
FBL-SC1-IN
3910 75R
3911 75R
3995 100R
CVBS-SC1_AV1-IN
3909 75R
CVBS-TER-OUT
3905 470R
7900 BC547B
3906 75R
3907 560R
A
0934
(OPTIONAL)
R-SC1_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
FBL-SC1-IN
4936
4914
4937
0933
(OPTIONAL)
SC1-B-IN_U-IN
SC1-G-IN_Y-IN
SC1-R_V-IN
0936
TO 0936 OF
O
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
FRONT-DETECT
R-FRONT-IN
A6-37 HEADPH-L
A6-38 HEADPH-R
7906 L4940
+11D
IN GND OUT
+8V (TO A1)
4911
+8V
3970 470R
7905 BC368
+5.2V
3971 10K
2926 470u
7907 BC847B
2927 47u
3972 10K
+5V
0935
C-FRONT-IN
Y_CVBS-FRON
CVBS-SC1_AV
C-SC2_SVHS-I
Y_CVBS-SC2_
CVBS-TER-OU
CVBS-SC2_MO
CVBS-TER-OU
L-CL_VL-OUT
R-CL_VL-OUT
Y_CVBS-SC2_
C-SC2_SVHS-I
L-SC2_AV2-IN
R-SC2_AV2-IN
R-SC2-OUT
L-SC2-OUT
COMM_LINE
CVBS-SC2_MO
1902-B
1902-C
1902-A
AUDIO - L OUT
AUDIO - R OUT
AUDIO - SL OUT
R-CL_VL-OUT
3937 150R
3936 150R
2923 330p
AUDIO-SL
3939 150R
3938 150R
2924 3n3
L-CL_VL-OUT
3941 150R
3940 150R
2925 330p
c007
c006
c005
c004
TO 1409 OF
2
0946
GND-IF
5200 6u8
+5V
2201 220n
2200 220u
5V
TUNER
1200
UV1316/A | U-2
VSPLL
NC
AS
VT
IF1
IF2|GND
GND
VST
AGC
SDA
SCL
+33V
2202 220n
6200 BZX284-C33
2203 220u
2.3V
4.8V
5V
3200 100R
3201 100R
I3
6201 BAS216
3250 22K
6205 BAS216
6202 BAS216
6204 BZX284-C6V8
6203 BZX284-C6V8
PIP
I2
0943
COMPAIR CONNECTOR SERVICE
1201
FROM 1003 OF
A 1
0940
DIPMATE
TO 0340 OF
F
HFB_X-RAY-PROT
+33V
EHT-INFO
+11D
R-CRT
G-CRT
B-CRT
CUTOFF
SDA
SCL
GND
c001
GND-LINEDRIVE
c002
I3 SDA
1V / div DC
0.2ms / div
TO 1000 OF
B 1
(SIM CON. MALE)
1205
B-SC1-IN_U-IN
G-SC1-IN_Y-IN
R-SC1_V-IN
FBL-SC1-IN
GND-RGB-SC1_YUV
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
GND-CVBS-IN
CVBS-SC2_MON-OUT
CVBS-SC1_AV1-IN
CVBS-TER-OUT
GND-CVBS-OUT
GND-IF
AGC
CVBS-PIP_TUN1-2-CVBS-IN
GND-PIP
STATUS1_PIP-AFT_PIP-50-60HZ
SEL-SVHS-RR_STATUS2
COMM_LINE
CUTOFF
GND-RGB-CRT
B-CRT
G-CRT
R-CRT
LINEDRIVE1
GND-LINEDRIVE
FRAMEDRIVE+
FRAMEDRIVE-
GND
EW-DRIVE
HFB_X-RAY-PROT
EHT-INFO
DYN-FASE-COR
TILT
DAC-HOP
PROTN
LDP
VFB
PANORAMA
RMT_LOC_DATA
+5.2V
A3-3
A3-4
A4-10
A4-11
A3-6
A3-20
A3-21
A3-5
A3-22
1 2 3 4 5 6 7


A 7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
(OPTIONAL)
PIP
0939
N-OUT
0938
AV2-IN
0937
SDA
SCL
STATUS1_PIP-AFT_PIP-50-60HZ
VFB
4934
HFB_X-RAY-PROT
9208
+5V
+8V
+33V
used with
PIP -module
(not for Europe)
+8V
3280
1K
4922
7280
PMBT2369
3281
1K
3282
1K
0942
SEL-SVHS-RR_STATUS2
FRONT-DETECT
RMT_LOC_DATA
RC5
SDA2
SCL2
used for
Gemstar
(not for Europe)
0948
PH-B
used with
Gemstar or PIP - module
(not for Europe)
(SCART2)
1901-A
3921
150R
3924
150R
3922
150R
3923
150R
2916
330p
2915
330p
3946
1K
2917
100p
R-SC2_AV2-IN
3944
1K
2920
100p
L-SC2_AV2-IN
3945
3K9
SEL-SVHS-RR_STATUS2
2919
330p
3942
8K2
3999
100R
+8V
3925
6R8
4913
2913
100n
2912
100u
3996
100R
C-SC2_SVHS-IN
3935
75R
N-OUT
3928
100R
7901
BC547B
3932
75R
3929
10K
3930
560R
3997
100R
Y_CVBS-SC2_AV2-IN
3908
75R
A5-2
A1-1
A6-34
A6-35
A5-18
A5-17
A5-13
A5-15
A8-27
A8-24
A8-25
A8-26
AUDIO-SL
4912
A5-33
AUDIO-C
AUDIO-SW
AUDIO-L
AUDIO-R
(POR)
+8V
+5V
SDA
SCL
SDA2
SCL2
DATA-IN-OUT
DATA-CLOCK
STAND-BY
SOUND-ENABLE
L-SC1_AV1-IN
L-SC2_AV2-IN
GND-SCART-AV
L-SC2-OUT
L-SC1_AV-OUT
GND-SCART-AV
R-SC2_AV2-IN
R-SC2-OUT
R-SC1_AV1-IN
R-SC1_AV-OUT
FRONT-DETECT
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
R-FRONT-IN
HEADPHONE-L
HEADPHONE-R
L-CL_VL-OUT
R-CL_VL-OUT
GND-AUDIO-OUT
AUDIO-SL
AUDIO-SURR
ON-OFF-LED
RC5
KEYBOARD
DEGAUSS-INPUT
A1
A2
A3
A4
A5
A6
42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
CL96532156_060.eps
010300

0933	A6
0934	A6
0935	A7
0936	B6
0937	A13
0938	C8
0939	B8
0940	E6
0942	B13
0943	F3
0946	F1
0948	D13
1200	G2
1201	H1
1205	I2
1901-A	C10
1901-B	A2
1902-A	D3
1902-B	D2
1902-C	D3
2200	F1
2201	F1
2202	H1
2203	H2
2902	B2
2903	B2
2906	A3
2909	B4
2910	B4
2912	E9
2913	E9
2915	D9
2916	D9
2917	D11
2919	E11
2920	D11
2923	E4
2924	E3
2925	F3
2926	D6
2927	E5
3200	G3
3201	G3
3250	G3
3280	A10
3281	B11
3282	C11
3900	A1
3901	A1
3902	A2
3903	A2
3905	C1
3906	D2
3907	D2
3908	F10
3909	D3
3910	C3
3911	C3
3913	C3
3915	B3
3916	B4
3918	B3
3919	B3
3920	A3
3921	C9
3922	D9
3923	D10
3924	C10
3925	E9
3928	F8
3929	F8
3930	F8
3932	F9
3935	E10
3936	E4
3937	E3
3938	E4
3939	E3
3940	F4
3941	F2
3942	E11
3944	D11
3945	D11
3946	C11
3970	D6
3971	D5
3972	E5
3991	B4
3992	C4
3993	C4
3994	C4
3995	D4
3996	E11
3997	F11
3999	E9
4911	D5
4912	H12
4913	E8
4914	A5
4922	B11
4934	A12
4936	A5
4937	A5
5200	F2
6200	H2
6201	G3
6202	H3
6203	G4
6204	G4
6205	H3
7280	B11
7900	C2
7901	F8
7905	D7
7906	C5
7907	E6
9208	A12
c001	I1
c002	I1
c004	E1
c005	E1
c006	E1
c007	E1

LSP (copper side overview)



0010	A9	2467	A5	2920	E1	3510	D6	3735	E5	4521	D7
0020	C8	2468	A5	2923	F1	3511	D7	3736	D5	4522	D7
0030	A7	2469	A4	2924	F1	3512	C7	3737	E5	4610	D1
0035	A7	2480	C6	2925	F1	3513	B7	3738	D5	4611	D1
0040	D5	2488	C4	2926	E3	3514	C7	3739	E5	4701	F5
0041	G5	2489	C1	2927	F3	3515	B6	3740	E5	4702	G5
0045	F7	2490	A6	2941	G4	3516	C8	3741	D5	4707	F5
0317	B4	2491	D2	2942	G4	3518	C7	3742	F5	4708	F6
0324	A6	2492	D4	2943	F5	3519	C7	3743	E5	4709	F6
0325	A1	2495	D3	2944	G5	3520	C7	3744	D5	4710	F6
0390	D1	2498	B5	2946	G6	3521	A9	3745	E5	4722	F5
0391	A2	2499	C5	2951	G5	3522	C7	3752	F5	4723	G6
0392	A4	2501	C7	2952	F6	3523	D7	3753	F5	4724	F5
0393	C1	2502	C7	2953	F4	3524	C7	3754	F5	4736	F5
0395	B1	2503	D7	3101	C9	3525	C7	3756	G5	4737	F5
0735	F6	2505	A6	3102	D9	3526	B6	3757	F6	4910	E1
0736	F6	2507	B8	3103	D9	3527	D6	3758	F5	4911	F2
0737	F7	2508	A7	3104	C9	3528	E8	3762	F4	4912	E4
0738	F6	2509	A7	3105	D9	3529	E8	3763	G6	4913	F1
0739	F5	2510	B6	3106	E9	3530	D7	3764	F6	4914	E1
0933	F1	2512	E6	3107	D9	3531	C7	3765	G5	4916	G1
0934	E1	2513	D7	3108	C9	3533	D6	3770	F5	4917	F1
0935	F1	2514	D7	3110	C8	3535	E6	3773	F5	4919	E4
0936	E4	2515	C6	3113	E9	3536	E6	3781	F6	4920	E1
0937	G2	2516	B7	3114	E9	3537	E6	3784	F7	4922	G3
0938	F1	2517	A6	3117	D9	3538	E6	3789	F6	4923	E5
0939	F2	2518	C7	3118	C9	3539	E6	3790	G4	4924	E5
0940	E2	2519	E7	3120	E9	3540	D6	3792	G5	4925	E5
0942	G3	2520	C7	3123	E9	3541	E6	3794	F5	4926	F5
0943	G1	2521	A6	3124	E9	3542	B6	3795	F5	4927	F5
0945	E10	2523	C6	3125	C10	3543	C7	3796	F5	4928	F5
0946	G2	2528	E8	3126	C10	3544	B7	3798	G5	4929	G1
0947	A10	2530	D7	3127	C9	3600	C1	3900	D1	4932	E1
0948	G2	2531	D6	3200	G1	3601	C1	3901	D1	4934	G3
1001	A8	2535	E6	3201	G1	3602	B1	3902	D1	4935	E1
1002	D8	2536	E7	3237	E9	3603	B1	3903	D1	4936	E1
1003	A6	2537	A8	3250	G1	3605	A1	3905	E1	4937	E1
1200	G1	2538	B7	3280	G3	3606	B1	3906	E1	5101	E8
1201	F1	2600	C1	3281	G3	3607	A1	3907	E1	5102	D9
1205	E3	2601	C1	3282	G3	3608	A1	3908	F1	5103	E8
1501	B9	2602	B1	3401	B4	3609	A1	3909	F1	5104	D8
1503	B7	2603	A1	3402	D3	3610	A1	3910	E1	5105	C8
1901	E1	2604	A1	3403	D3	3611	B1	3911	E1	5110	E7
1902	F1	2605	C1	3404	D3	3612	B1	3913	E1	5115	E7
2101	D9	2610	B1	3406	D4	3613	B1	3915	E1	5200	G2
2102	D9	2620	A1	3407	D4	3614	B1	3916	E1	5400	A6
2103	D9	2621	A1	3409	C2	3615	B1	3918	E1	5401	B4
2104	E8	2622	A1	3410	D4	3616	B1	3919	E1	5410	D2
2105	C9	2624	A1	3411	D3	3617	C1	3920	D1	5411	C3
2106	C9	2625	A1	3414	D4	3618	B1	3921	D2	5421	B4
2107	E9	2627	A1	3415	D4	3619	C1	3922	E2	5422	C6
2108	C9	2629	A1	3416	D4	3620	B1	3923	D1	5423	C5
2109	E9	2640	B1	3417	C4	3621	B1	3924	D1	5424	C5
2110	C9	2642	C2	3418	C6	3622	B1	3925	F1	5425	C5
2111	C9	2653	A1	3423	C4	3623	A1	3928	F1	5426	C4
2113	E8	2704	G4	3425	C5	3624	A1	3929	F1	5430	B3
2114	B9	2710	F5	3426	C5	3625	A1	3930	F1	5460	A3
2200	F1	2711	F4	3431	B4	3626	A1	3932	F1	5461	A3
2201	G1	2712	F4	3439	C1	3627	B1	3935	F1	5462	C2
2202	G1	2730	D4	3440	C1	3629	A1	3936	F1	5463	C2
2203	G1	2731	E4	3441	C1	3630	D1	3937	F1	5464	C3
2400	B5	2732	E6	3442	C1	3631	D1	3938	F1	5465	C3
2401	B4	2733	E6	3443	C1	3632	C1	3939	F1	5466	A5
2409	D3	2734	D5	3444	D1	3633	C1	3940	F1	5467	C5
2412	D3	2735	E5	3445	C1	3640	B1	3941	F1	5503	B8
2413	D3	2736	E5	3446	C1	3641	B1	3942	E1	5504	B8
2414	D3	2737	E5	3447	C1	3642	B1	3944	E1	5505	C7
2415	D4	2738	D5	3450	A6	3643	B1	3945	E1	5506	D7
2416	D3	2739	E5	3451	A5	3644	A1	3946	D1	5510	A6
2417	D4	2756	F6	3460	A4	3645	C2	3970	F3	5620	A1
2418	C3	2758	F5	3461	A4	3652	C3	3971	F3	6103	D9
2419	C5	2759	G6	3462	C2	3653	A1	3972	F3	6105	D9
2420	C3	2760	F6	3463	C1	3701	G4	3991	E1	6106	C9
2421	B6	2761	F3	3464	C3	3702	G3	3992	E1	6107	E8
2422	B6	2762	G6	3465	C2	3703	G6	3993	E1	6108	B9
2423	B5	2763	G6	3466	A5	3704	G5	3994	E1	6109	B9
2425	C4	2765	G4	3467	A5	3708	G5	3995	E2	6111	E8
2426	C4	2766	F7	3468	A4	3710	G4	3996	E2	6120	E9
2429	C5	2767	G4	3469	A5	3711	G4	3997	E2	6121	E9
2430	C6	2768	G6	3475	A5	3712	F4	3998	E10	6122	E9
2431	B4	2774	F6	3481	D6	3713	F4	3999	F2	6200	G1
2432	B5	2775	F7	3483	D2	3714	G4	4102	E9	6201	G1
2433	B4	2776	F7	3484	D2	3715	G4	4103	E9	6202	G1
2434	B5	2782	F4	3485	D2	3716	G4	4401	C1	6203	G1
2435	C4	2783	F6	3486	D2	3717	G4	4402	C1	6204	G1
2443	C1	2784	G5	3487	D2	3718	G5	4403	A1	6205	G1
2444	D1	2785	G5	3488	D1	3719	G6	4404	C6	6405	C2
2445	D1	2786	G5	3489	B1	3721	F4	4405	D2	6406	D4
2446	C1	2787	F5	3490	D6	3722	F4	4406	A1	6407	D4
2447	C1	2902	D1	3491	D1	3723	F4	4407	A1	6408	D4
2450	A2	2903	D1	3495	C5	3724	F4	4408	B1	6421	D4
2455	D2	2906	D1	3499	C5	3725	F5	4409	C1	6422	D5
2459	A5	2909	E1	3500	A8	3726	F4	4417	D4	6423	C4
2460	A4	2910	E1	3501	A8	3727	F4	4418	C6	6440	D1
2461	A4	2912	F1	3502	A7	3728	F4	4441	D1	6441	D1
2462	C1	2913	F1	3503	A9	3730	D5	4442	D3	6442	A1
2463	C1	2915	D1	3504	C7	3731	E5	4443	D3	6460	A4
2464	C2	2916	D1	3507	D6	3732	E5	4444	D3	6461	A4
2465	C2	2917	D1	3508	C7	3733	E5	4482	D2	6462	C1
2466	A6	2919	E1	3509	B9	3734	E5	4483	D2	6463	C1

6 7 8 9 10

6464	C2
6465	C2
6466	A5
6468	A4
6480	C5
6481	D6
6482	D2
6483	C2
6499	C5
6501	A7
6502	A7
6503	A7
6504	A6
6505	C6
6506	C7
6507	E7
6508	C7
6510	B6
6511	D8
6512	D8
6514	D6
6515	B8
6516	D7
6517	D6
6518	C7
6520	E7
6521	E6
6522	E6
6600	C1
6616	B1
6619	A1
6620	A1
6621	A1
6622	A1
6623	B2
6730	G4
6731	G4
7100	C9
7101	C9
7102	D8
7103	E9
7104	E9
7280	G3
7407	D3
7408	D3
7409	D4
7421	D3
7440	C1
7441	C1
7442	C1
7480	D5
7481	D2
7482	D2
7483	D2
7502	C8
7504	C7
7505	C8
7506	D8
7510	E6
7511	E6
7528	E7
7529	D7
7600	C1
7602	B1
7603	B1
7605	C1
7606	C1
7610	D1
7611	D1
7620	A1
7640	B1
7641	C2
7652	B6
7701	G6
7702	F4
7710	F4
7711	F5
7715	F4
7720	D5
7721	E5
7722	D5
7723	E5
7724	D5
7725	E5
7730	G4
7731	G4
7732	G4
7733	G6
7740	G5
7750	G4
7900	E1
7901	F1
7905	E3
7906	F2
7907	F3
9001	C9
9102	D9
9110	E7
9115	E7
9201	G3
9202	F2
9203	F5
9204	F6
9205	F6
9206	F5
9207	E4
9208	G2
9209	E4
9210	G3
9211	G3
9212	G2
9213	E1
9214	E5
9215	E4
9216	F2
9217	E2
9218	E1
9220	E1
9221	G2
9222	F6
9223	F4
9224	F6
9225	D1
9226	F1
9227	F1
9228	F1
9229	G1
9230	E2
9231	E2
9401	B4
9402	B1
9403	B1
9404	B1
9408	C2
9412	C3
9414	C3
9418	B1
9421	C2
9423	C4
9424	D1
9425	C5
9426	C4
9428	C2
9429	C4
9430	C3
9431	A1
9466	A5
9480	C5
9501	B7
9502	B7
9503	B7
9504	B7
9505	D8
9511	C7
9512	C7
9513	C7
9514	C8
9515	E6
9517	E7
9518	C7
9519	C8
9520	E6
9523	D7
9524	D7
9525	C7
9526	A7
9620	A1
9622	A1
9623	B2
9624	B3
9705	G7
9707	G4
9712	F5
9713	G4
9714	G4
9715	G4
9718	G4
9720	G3
9721	G6
9722	G4
9723	F5
9906	D6
9907	E3
9908	E3
9909	E2
9910	E2
9911	E2
9912	E2
9913	E2
9914	E3
9915	E3
9916	E3
9917	E3
9918	E3
9919	E3
9922	E2
9925	F2
9926	F2
9927	F3
9928	F3
9929	F3
9930	E1
9931	G1
9932	E2
9933	E3
9934	F3
9935	F2
9936	E4
9943	E3
9944	E4
9945	E5
9946	F3
9947	E5
9948	D4
9950	D4
9951	D5
9952	D4
9957	F3
9958	E5
9960	E3
9961	F3
9962	F3
9963	F5
9964	F5
9965	F2
9966	F5
9967	D5
9968	D6
9969	F3
9970	F2
9971	F2
9972	G1
9976	D1
9980	E2
9981	F1
9982	F1
9983	F1
9984	F2
9985	G2
9987	F2
9988	F2
9989	E3
9990	E2
9991	F4
9992	F4
9993	F2
9994	F2
9995	F2
9996	F3
9997	G2
9998	G3
9999	F4

CL96532156_090.eps
030300

A

B

Part 2

C

CL96532156_084.pdf
180200

D

E

Part 4

F

G

CL96532156_086.pdf
180200

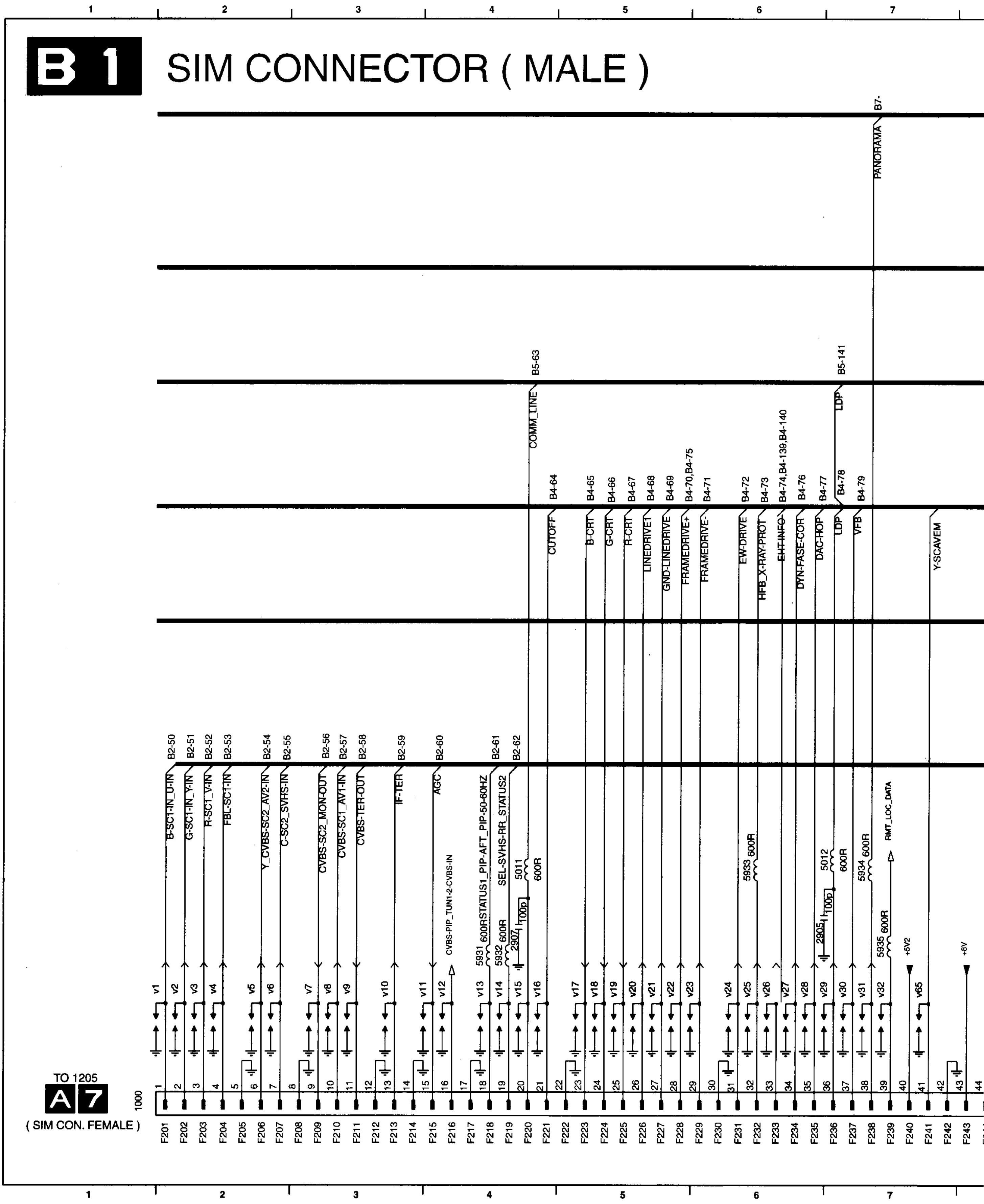
6 7 8 9 10

CL96532156_073.eps
030300

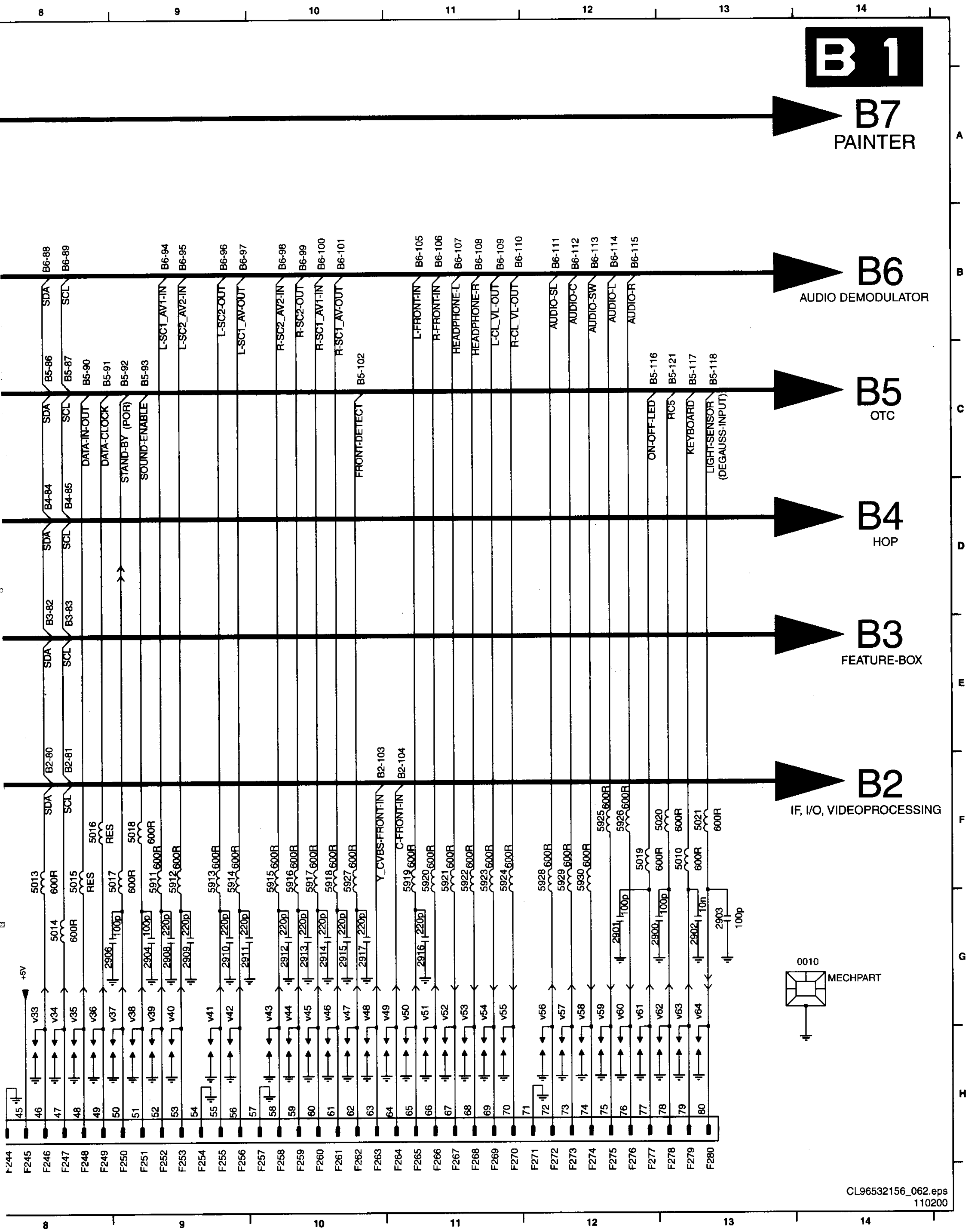
Sim connector (male)

v5 G2	v9 G3	v13 G4	v17 G5	v21 G5	v25 G6	v29 G7	v33 G8	v37 G9	v41 G9	v45 G10	v49 G11	v53 G11	v57 G12	v61 G12	v65 G7
v6 G2	v10 G3	v14 G4	v18 G5	v22 G5	v26 G6	v30 G7	v34 G8	v38 G9	v42 G9	v46 G10	v50 G11	v54 G11	v58 G12	v62 G13	0010 G14
v7 G3	v11 G4	v15 G4	v19 G5	v23 G6	v27 G6	v31 G7	v35 G8	v39 G9	v43 G10	v47 G10	v51 G11	v55 G11	v59 G12	v63 G13	1000 H1
v8 G3	v12 G4	v16 G4	v20 G5	v24 G6	v28 G6	v32 G7	v36 G8	v40 G9	v44 G10	v48 G10	v52 G11	v56 G12	v60 G12	v64 G13	2900 G12

B 1 SIM CONNECTOR (MALE)

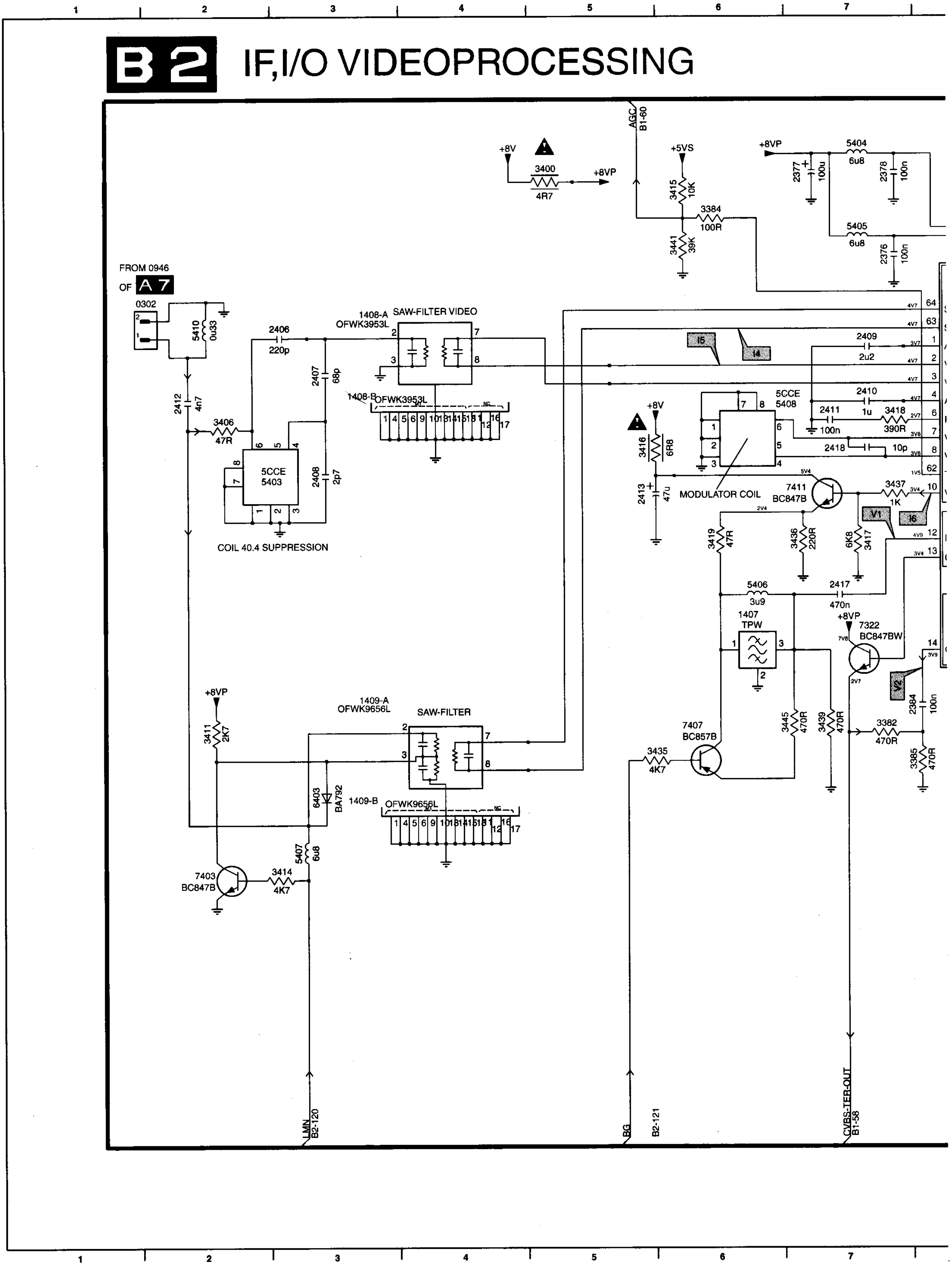

1
2
3
4
5
6
7
B7-
PANORAMA
B5-63
COMM_LINE
B5-141
LDP
B4-64
B4-65
B4-66
B4-67
B4-68
B4-69
B4-70,B4-75
B4-71
B4-72
B4-73
B4-74,B4-139,B4-140
B4-76
B4-77
B4-78
B4-79
CUTOFF
B-CRT
G-CRT
R-CRT
LINEDRIVE1
GND-LINEDRIVE
FRAMEDRIVE+
FRAMEDRIVE-
EW-DRIVE
HFB_X-RAY-PROT
EHT-INFO
DYN-FASE-COR
DAC-HOP
LDP
VFB
Y-SCAVEM
B2-50
B2-51
B2-52
B2-53
B2-54
B2-55
B2-56
B2-57
B2-58
B2-59
B2-60
B2-61
B2-62
B-SC1-IN_U-IN
G-SC1-IN_Y-IN
R-SC1_V-IN
FBL-SC1-IN
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
CVBS-SC2_MON-OUT
CVBS-SC1_AV1-IN
CVBS-TER-OUT
IF-TER
AGC
CVBS-PIP_TUN1-2-CVBS-IN
5931 600R
STATUS1_PIP-AFT_PIP-50-60HZ
5932 600R
SEL-SVHS-RR_STATUS2
2907
100p
5011
600R
5933 600R
5012
600R
2905
100p
5934 600R
5935 600R
RMT_LOC_DATA
+5V2
+8V
v1
v2
v3
v4
v5
v6
v7
v8
v9
v10
v11
v12
v13
v14
v15
v16
v17
v18
v19
v20
v21
v22
v23
v24
v25
v26
v27
v28
v29
v30
v31
v32
v65
TO 1205
A 7
(SIM CON. FEMALE)
1000
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
F201
F202
F203
F204
F205
F206
F207
F208
F209
F210
F211
F212
F213
F214
F215
F216
F217
F218
F219
F220
F221
F222
F223
F224
F225
F226
F227
F228
F229
F230
F231
F232
F233
F234
F235
F236
F237
F238
F239
F240
F241
F242
F243
1
2
3
4
5
6
7

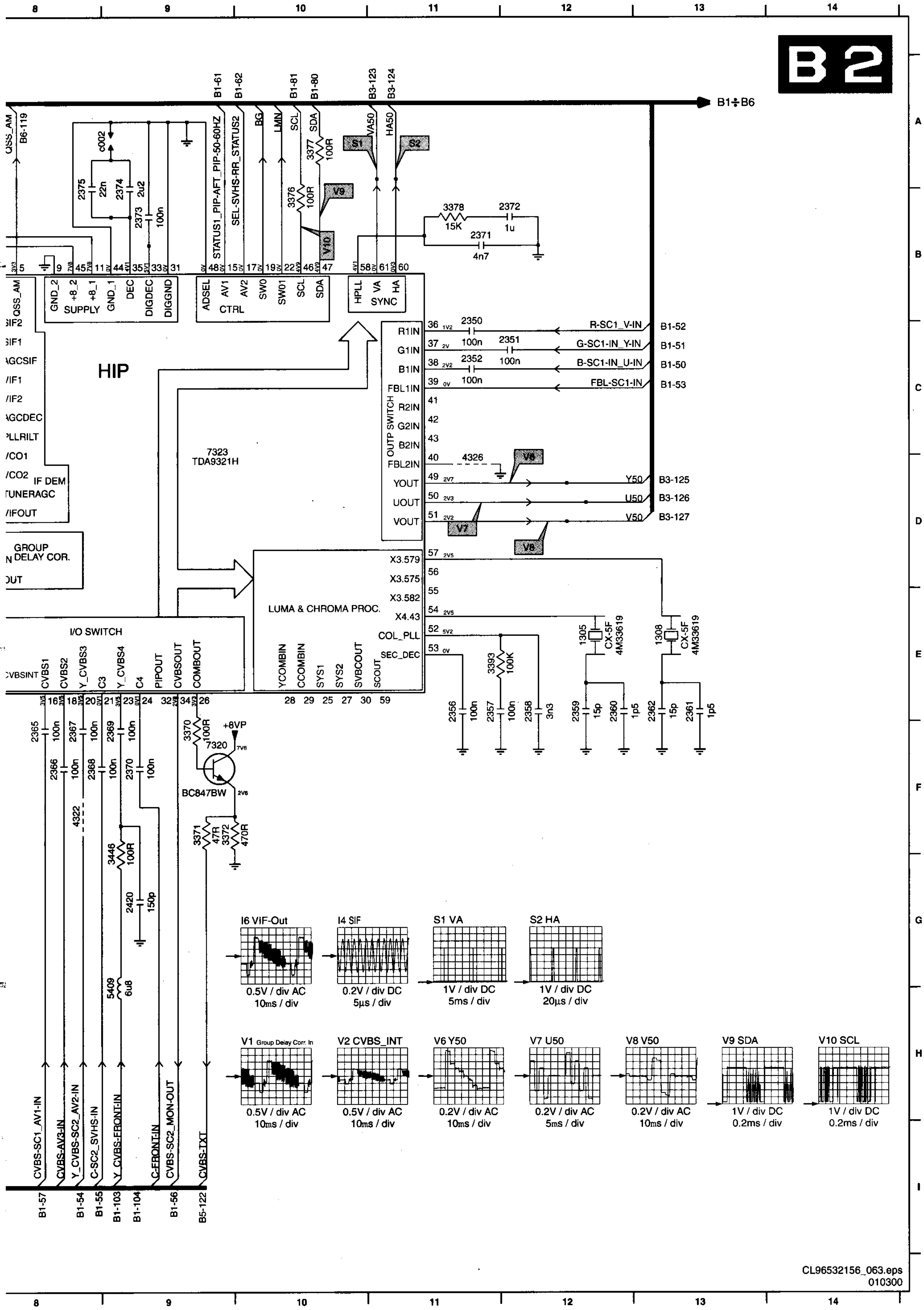
2901 G12	2905 G6	2909 G9	2913 G10	2917 G10	5013 F8	5017 F9	5021 F13	5914 F9	5918 F10	5922 F11	5926 F12	5930 F12	5934 F7
2902 G13	2906 G8	2910 G9	2914 G10	5010 F13	5014 G8	5018 F9	5911 F9	5915 F10	5919 F11	5923 F11	5927 F10	5931 G4	5935 G7
2903 G13	2907 G4	2911 G9	2915 G10	5011 F4	5015 F8	5019 F12	5912 F9	5916 F10	5920 F11	5924 F11	5928 F12	5932 G4	
2904 G9	2908 G9	2912 G10	2916 G11	5012 F7	5016 F8	5020 F13	5913 F9	5917 F10	5921 F11	5925 F12	5929 F12	5933 F6	


8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
B 1
B7
PAINTER
B6
AUDIO DEMODULATOR
B5
OTC
B4
HOP
B3
FEATURE-BOX
B2
IF, I/O, VIDEOPROCESSING
B6-88 SDA
B6-89 SCL
B6-94 L-SC1_AV1-IN
B6-95 L-SC2_AV2-IN
B6-96 L-SC2-OUT
B6-97 L-SC1_AV-OUT
B6-98 R-SC2_AV2-IN
B6-99 R-SC2-OUT
B6-100 R-SC1_AV1-IN
B6-101 R-SC1_AV-OUT
B6-105 L-FRONT-IN
B6-106 R-FRONT-IN
B6-107 HEADPHONE-L
B6-108 HEADPHONE-R
B6-109 L-CL_VL-OUT
B6-110 R-CL_VL-OUT
B6-111 AUDIO-SL
B6-112 AUDIO-C
B6-113 AUDIO-SW
B6-114 AUDIO-L
B6-115 AUDIO-R
B5-86 SDA
B5-87 SCL
B5-90 DATA-IN-OUT
B5-91 DATA-CLOCK
B5-92 STAND-BY (POR)
B5-93 SOUND-ENABLE
B5-102 FRONT-DETECT
B5-116 ON-OFF-LED
B5-121 RC5
B5-117 KEYBOARD
B5-118 LIGHT-SENSOR (DEGAUSS-INPUT)
B4-84 SDA
B4-85 SCL
B3-82 SDA
B3-83 SCL
B2-80 SDA
B2-81 SCL
B2-103 Y_CVBS-FRONT-IN
B2-104 C-FRONT-IN
5013 600R
5014 600R
5015 RES
5016 RES
5017 600R
5018 600R
5911 600R
5912 600R
5913 600R
5914 600R
5915 600R
5916 600R
5917 600R
5918 600R
5927 600R
5919 600R
5920 600R
5921 600R
5922 600R
5923 600R
5924 600R
5928 600R
5929 600R
5930 600R
5925 600R
5926 600R
5019 600R
5020 600R
5010 600R
5021 600R
2906 100p
2904 100p
2908 220p
2909 220p
2910 220p
2911 220p
2912 220p
2913 220p
2914 220p
2915 220p
2917 220p
2916 220p
2901 100p
2900 100p
2902 10n
2903 100p
+5V
v33
v34
v35
v36
v37
v38
v39
v40
v41
v42
v43
v44
v45
v46
v47
v48
v49
v50
v51
v52
v53
v54
v55
v56
v57
v58
v59
v60
v61
v62
v63
v64
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
F245
F246
F247
F248
F249
F250
F251
F252
F253
F254
F255
F256
F257
F258
F259
F260
F261
F262
F263
F264
F265
F266
F267
F268
F269
F270
F271
F272
F273
F274
F275
F276
F277
F278
F279
F280
0010
MECHPART

CL96532156_062.eps
110200

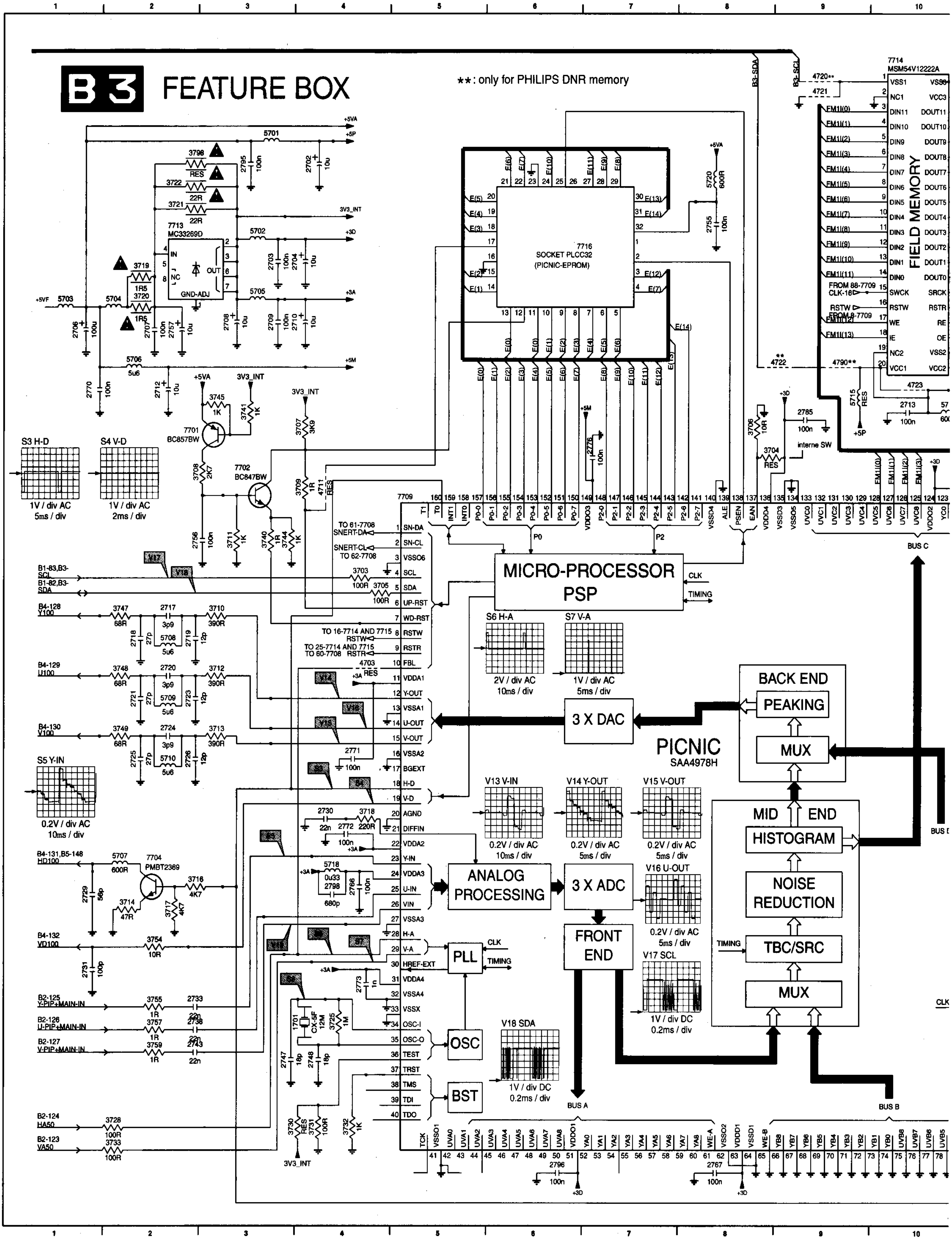
IF, I/O videoprocessing

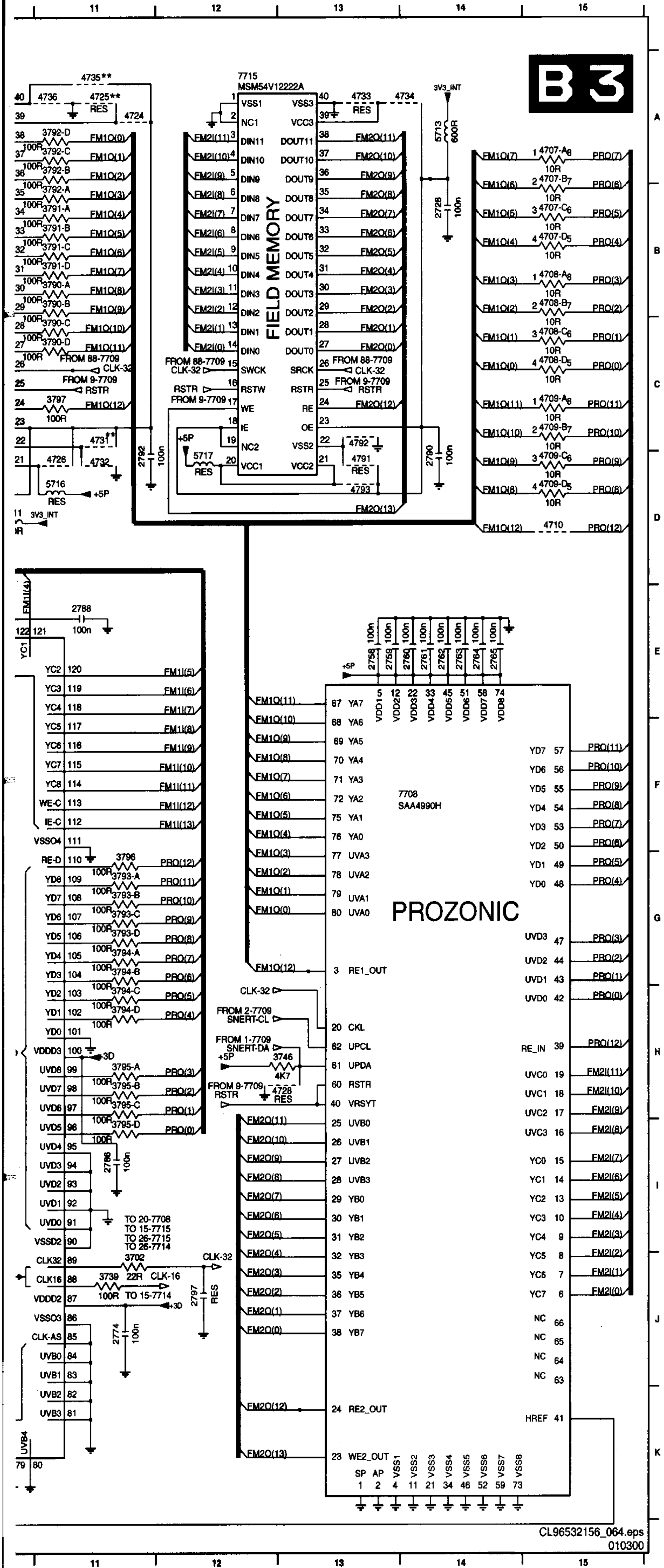

B2
IF,I/O VIDEOPROCESSING
1
2
3
4
5
6
7
AGC
B1-60
+8V
3400
4R7
+8VP
+5VS
3415
10K
3384
100R
3441
39K
+8VP
2377
100u
5404
6u8
2378
100n
5405
6u8
2376
100n
FROM 0946
OF A7
0302
5410
0u33
2406
220p
1408-A
OFWK3953L
SAW-FILTER VIDEO
2407
68p
1408-B
OFWK3953L
2412
4n7
3406
47R
5CCE
5403
2408
2p7
COIL 40.4 SUPPRESSION
I5
I4
2409
2u2
2410
1u
2411
100n
3418
390R
2418
10p
5CCE
5408
MODULATOR COIL
+8V
3416
6R8
2413
47u
7411
BC847B
3437
1K
V1
I6
3419
47R
3436
220R
3417
6K8
5406
3u9
2417
470n
1407
TPW
+8VP
7322
BC847BW
V2
2384
100n
3382
470R
3385
470R
3445
470R
3439
470R
7407
BC857B
3435
4K7
+8VP
3411
2K7
1409-A
OFWK9656L
SAW-FILTER
6403
BA792
1409-B
OFWK9656L
5407
6u8
7403
BC847B
3414
4K7
LMN
B2-120
BG
B2-121
CVBS-TER-OUT
B1-58
64
63
1
2
3
4
6
7
8
62
10
12
13
14


B2
B1÷B6
HIP
7323
TDA9321H
SUPPLY
GND_2
+8_2
+8_1
GND_1
DEC
DIGDEC
DIGGND
CTRL
ADSEL
AV1
AV2
SW0
SW01
SCL
SDA
SYNC
HPLL
VA
HA
OUTP SWITCH
R1IN
G1IN
B1IN
FBL1IN
R2IN
G2IN
B2IN
FBL2IN
YOUT
UOUT
VOUT
LUMA & CHROMA PROC.
X3.579
X3.575
X3.582
X4.43
COL_PLL
SEC_DEC
YCOMBIN
CCOMBIN
SYS1
SYS2
SVBCOUT
SCOUT
I/O SWITCH
CVBSINT
CVBS1
CVBS2
Y_CVBS3
C3
Y_CVBS4
C4
PIPOUT
CVBSOUT
COMBOUT
IF DEM
TUNERAGC
GROUP DELAY COR.
STATUS1_PIP-AFT_PIP-50-60HZ
SEL-SVHS-RR_STATUS2
BG
LMN
SCL
SDA
VA50
HA50
B1-61
B1-62
B1-81
B1-80
B3-123
B3-124
B6-119
R-SC1_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
FBL-SC1-IN
B1-52
B1-51
B1-50
B1-53
Y50
U50
V50
B3-125
B3-126
B3-127
S1
S2
V6
V7
V8
V9
V10
3376 100R
3377 100R
3378 15K
2372 1u
2371 4n7
2375 22n
2374 2u2
2373 100n
c002
2350 100n
2351 100n
2352 100n
4326
3393 100K
2356 100n
2357 100n
2358 3n3
2359 15p
2360 1p5
2362 15p
2361 1p5
1305 CX-5F 4M33619
1308 CX-5F 4M33619
2365 100n
2366 100n
2367 100n
2368 100n
2369 100n
2370 100n
4322
3446 100R
2420 150p
5409 6u8
3370 100R
+8VP
7320
BC847BW
3371 47R
3372 470R
CVBS-SC1_AV1-IN
CVBS-AV3-IN
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
Y_CVBS-FRONT-IN
C-FRONT-IN
CVBS-SC2_MON-OUT
CVBS-TXT
B1-57
B1-54
B1-55
B1-103
B1-104
B1-56
B5-122
I6 VIF-Out
0.5V / div AC
10ms / div
I4 SIF
0.2V / div DC
5µs / div
S1 VA
1V / div DC
5ms / div
S2 HA
1V / div DC
20µs / div
V1 Group Delay Corr. In
0.5V / div AC
10ms / div
V2 CVBS_INT
0.5V / div AC
10ms / div
V6 Y50
0.2V / div AC
10ms / div
V7 U50
0.2V / div AC
5ms / div
V8 V50
0.2V / div AC
10ms / div
V9 SDA
1V / div DC
0.2ms / div
V10 SCL
1V / div DC
0.2ms / div
CL96532156_063.eps
010300
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I

0302	B1
1305	E12
1308	E13
1407	E6
1408-A	B3
1408-B	C3
1409-A	E3
1409-B	F3
2350	C11
2351	C12
2352	C11
2356	E11
2357	E11
2358	E12
2359	E12
2360	E12
2361	E13
2362	E13
2365	F8
2366	F8
2367	F8
2368	F8
2369	F9
2370	F9
2371	B11
2372	B12
2373	B9
2374	A9
2375	A8
2376	B7
2377	A7
2378	A7
2384	F8
2406	C3
2407	C3
2408	D3
2409	C7
2410	C7
2411	C7
2412	C2
2413	D5
2417	E7
2418	D7
2420	G9
3370	F9
3371	F9
3372	F9
3376	B10
3377	A10
3378	B11
3382	F7
3384	B6
3385	F8
3393	E11
3400	A5
3406	C2
3411	F2
3414	G3
3415	B6
3416	D5
3417	D7
3418	C7
3419	D6
3435	F6
3436	D7
3437	D7
3439	F7
3441	B6
3445	F7
3446	F9
4322	F8
4326	D11
5403	D2
5404	A7
5405	B7
5406	E6
5407	G3
5408	C6
5409	G9
5410	C2
6403	F3
7320	F9
7322	E7
7323	C9
7403	G2
7407	F6
7411	D7
c002	A9

Feature box

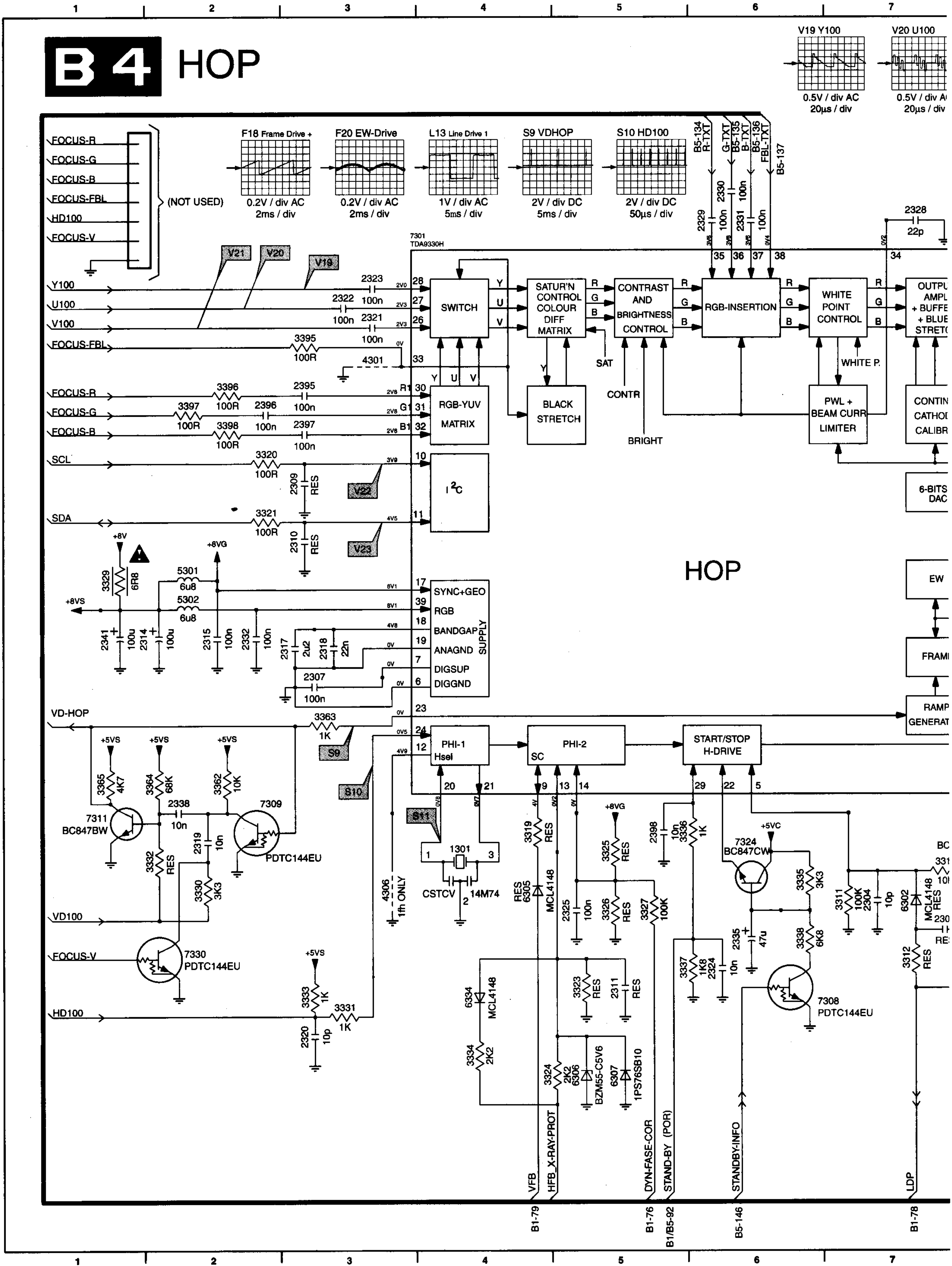

B3 FEATURE BOX
**: only for PHILIPS DNR memory
7713 MC33269D
7716 SOCKET PLCC32 (PICNIC-EPROM)
7714 MSM54V12222A
FIELD MEMORY
7701 BC857BW
7702 BC847BW
7704 PMBT2369
7709
S3 H-D 1V / div AC 5ms / div
S4 V-D 1V / div AC 2ms / div
S5 Y-IN 0.2V / div AC 10ms / div
S6 H-A 2V / div AC 10ms / div
S7 V-A 1V / div AC 5ms / div
V13 V-IN 0.2V / div AC 10ms / div
V14 Y-OUT 0.2V / div AC 5ms / div
V15 V-OUT 0.2V / div AC 5ms / div
V16 U-OUT 0.2V / div AC 5ms / div
V17 SCL 1V / div DC 0.2ms / div
V18 SDA 1V / div DC 0.2ms / div
MICRO-PROCESSOR PSP
CLK
TIMING
3 X DAC
PICNIC SAA4978H
BACK END
PEAKING
MUX
MID END
HISTOGRAM
NOISE REDUCTION
TBC/SRC
MUX
ANALOG PROCESSING
3 X ADC
FRONT END
PLL
OSC
BST
BUS A
BUS B
BUS C
P0
P2
B1-83,B3-SCL
B1-82,B3-SDA
B4-128 Y100
B4-129 U100
B4-130 V100
B4-131,B5-148 HD100
B4-132 VD100
B2-125 Y-PIP+MAIN-IN
B2-126 U-PIP+MAIN-IN
B2-127 V-PIP+MAIN-IN
B2-124 HA50
B2-123 VA50
TO 61-7708 SNERT-DA
SNERT-CL TO 62-7708
TO 16-7714 AND 7715 RSTW
TO 25-7714 AND 7715 TO 60-7708 RSTR
FROM 88-7709 CLK-16
FROM 8-7709 RSTW
interne SW
1 SN-DA
2 SN-CL
3 VSSO6
4 SCL
5 SDA
6 UP-RST
7 WD-RST
8 RSTW
9 RSTR
10 FBL
11 VDDA1
12 Y-OUT
13 VSSA1
14 U-OUT
15 V-OUT
16 VSSA2
17 BGEXT
18 H-D
19 V-D
20 AGND
21 DIFFIN
22 VDDA2
23 Y-IN
24 VDDA3
25 U-IN
26 VIN
27 VSSA3
28 H-A
29 V-A
30 HREF-EXT
31 VDDA4
32 VSSA4
33 VSSX
34 OSC-I
35 OSC-O
36 TEST
37 TRST
38 TMS
39 TDI
40 TDO
1701 CX-5F 12M
+5VA +5P 3V3_INT +3D +3A +5M +5VF
5701 5702 5703 5704 5705 5706 5707 5708 5709 5710 5715 5718 5720
3798 RES 3722 22R 3721 22R 3719 1R5 3720 1R5
3745 1K 3741 1K 3707 3K9 3708 2K7 3709 1R 4711 RES
3703 100R 3705 100R 3747 68R 3748 68R 3749 68R 3710 390R 3712 390R 3713 390R
3716 4K7 3717 4K7 3714 47R 3754 10R 3755 1R 3757 1R 3759 1R 3728 100R 3733 100R
3730 RES 3731 100R 3732 1K 3725 1M 3718 220R 3706 10R 3704 RES 4703 RES
4720** 4721 4722** 4790** 4723
VSS1 NC1 DIN11 DIN10 DIN9 DIN8 DIN7 DIN6 DIN5 DIN4 DIN3 DIN2 DIN1 DIN0 SWCK RSTW WE IE NC2 VCC1
VSS VCC3 DOUT11 DOUT10 DOUT9 DOUT8 DOUT7 DOUT6 DOUT5 DOUT4 DOUT3 DOUT2 DOUT1 DOUT0 SRCK RSTR RE OE VSS2 VCC2
B3-SDA B3-SCL


B 3
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J
K
7715
MSM54V12222A
FIELD MEMORY
VSS1
NC1
DIN11
DIN10
DIN9
DIN8
DIN7
DIN6
DIN5
DIN4
DIN3
DIN2
DIN1
DIN0
SWCK
RSTW
WE
IE
NC2
VCC1
VSS3
VCC3
DOUT11
DOUT10
DOUT9
DOUT8
DOUT7
DOUT6
DOUT5
DOUT4
DOUT3
DOUT2
DOUT1
DOUT0
SRCK
RSTR
RE
OE
VSS2
VCC2
3V3_INT
5713
600R
2728
100n
2792
100n
2790
100n
5717
RES
5716
RES
+5P
4735**
4736
4725**
RES
4724
4731**
4726
4732
4733
RES
4734
4792
4791
RES
4793
FROM 88-7709
CLK-32
FROM 9-7709
RSTR
RSTW
4707-A
4707-B
4707-C
4707-D
4708-A
4708-B
4708-C
4708-D
4709-A
4709-B
4709-C
4709-D
4710
10R
3790-A
3790-B
3790-C
3790-D
3791-A
3791-B
3791-C
3791-D
3792-A
3792-B
3792-C
3792-D
3797
100R
2788
100n
7708
SAA4990H
PROZONIC
YA7
YA6
YA5
YA4
YA3
YA2
YA1
YA0
UVA3
UVA2
UVA1
UVA0
RE1_OUT
CKL
UPCL
UPDA
RSTR
VRSYT
UVB0
UVB1
UVB2
UVB3
YB0
YB1
YB2
YB3
YB4
YB5
YB6
YB7
RE2_OUT
WE2_OUT
SP
AP
YD7
YD6
YD5
YD4
YD3
YD2
YD1
YD0
UVD3
UVD2
UVD1
UVD0
RE_IN
UVC0
UVC1
UVC2
UVC3
YC0
YC1
YC2
YC3
YC4
YC5
YC6
YC7
NC
HREF
FROM 2-7709
SNERT-CL
FROM 1-7709
SNERT-DA
3746
4K7
FROM 9-7709
4728
RES
3796
3793-A
3793-B
3793-C
3793-D
3794-A
3794-B
3794-C
3794-D
3795-A
3795-B
3795-C
3795-D
2786
100n
TO 20-7708
TO 15-7715
TO 26-7715
TO 26-7714
3702
22R
CLK-32
CLK-16
3739
100R
TO 15-7714
2797
RES
2774
100n
+3D
CL96532156_064.eps
010300

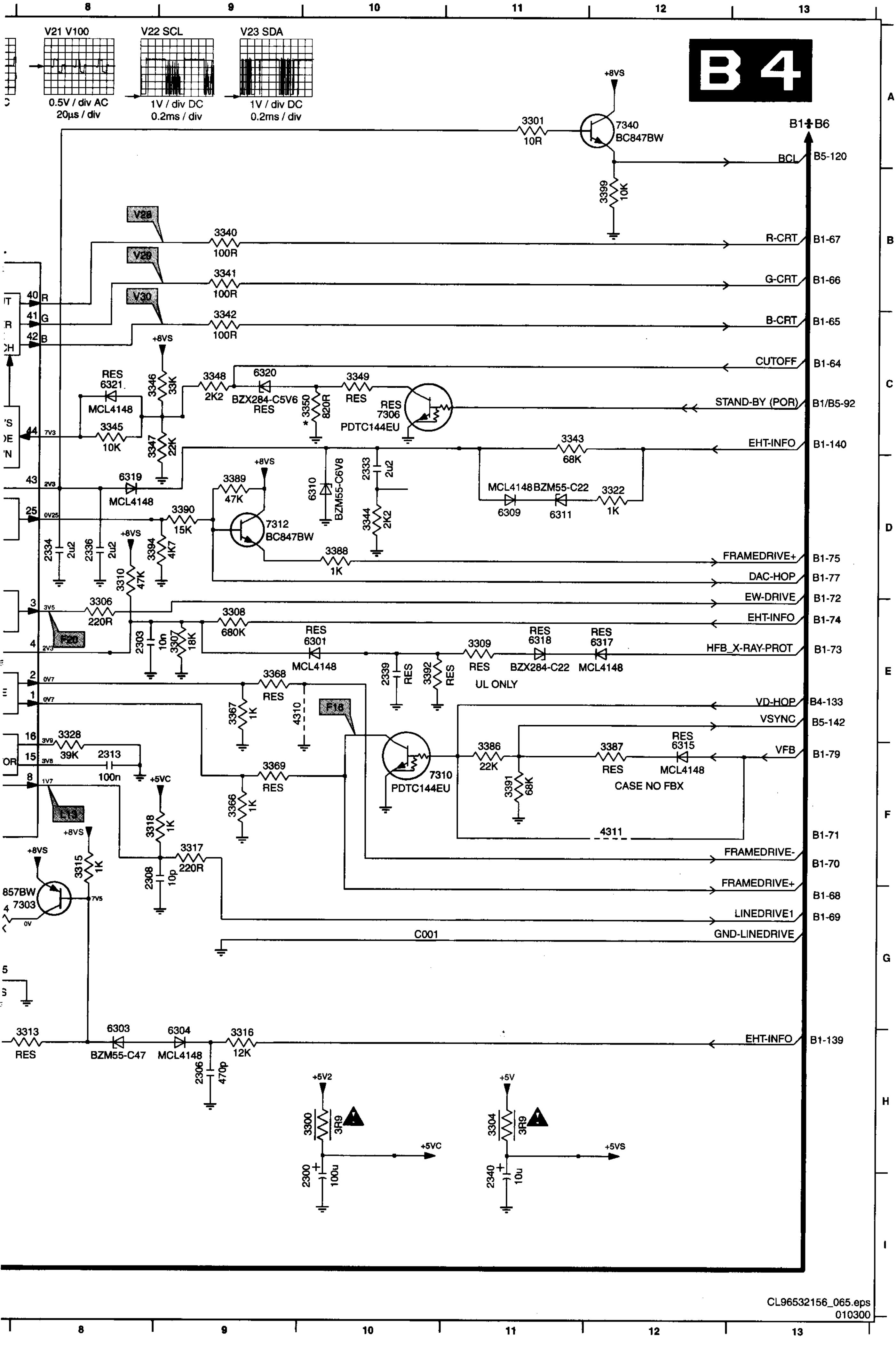
1701	J4
2702	B4
2703	C3
2704	C4
2706	C1
2707	C2
2708	C3
2709	C3
2710	C4
2712	D2
2713	D10
2717	F2
2718	F2
2719	F2
2720	F2
2721	G2
2723	G2
2724	G2
2725	G2
2726	G2
2728	B14
2729	I1
2730	H4
2731	I1
2733	J2
2738	J2
2743	J2
2747	J3
2748	J4
2755	B8
2756	E2
2757	C2
2758	E13
2759	E13
2760	E14
2761	E14
2762	E14
2763	E14
2764	E14
2765	E14
2766	I4
2767	K8
2770	D1
2771	G4
2772	H4
2773	I4
2774	J11
2776	D7
2785	D9
2786	I11
2788	E11
2790	D14
2792	D11
2795	B3
2796	K6
2797	J12
2798	I4
3702	J11
3703	F4
3704	D8
3705	F4
3706	D8
3707	D4
3708	E2
3709	E4
3710	F3
3711	E3
3712	F3
3713	G3
3714	I2
3716	H2
3717	I2
3718	H4
3719	C2
3720	C2
3721	B2
3722	B2
3725	J4
3728	K2
3730	K3
3731	K4
3732	K4
3733	K2
3739	J11
3740	E3
3741	D3
3744	E3
3745	D3
3746	H13
3747	F2
3748	F2
3749	G2
3754	I2
3755	J2
3757	J2
3759	J2
3790-A	B11
3790-B	B11
3790-C	C11
3790-D	C11
3791-A	B11
3791-B	B11
3791-C	B11
3791-D	B11
3792-A	B11
3792-B	A11
3792-C	A11
3792-D	A11
3793-A	G11
3793-B	G11
3793-C	G11
3793-D	G11
3794-A	G11
3794-B	G11
3794-C	H11
3794-D	H11
3795-A	H11
3795-B	H11
3795-C	H11
3795-D	I11
3796	G11
3797	C11
3798	B2
4703	F4
4707-A	A15
4707-B	A15
4707-C	B15
4707-D	B15
4708-A	B15
4708-B	B15
4708-C	C15
4708-D	C15
4709-A	C15
4709-B	C15
4709-C	D15
4709-D	D15
4710	D15
4711	E4
4720	A9
4721	A9
4722	D9
4723	D10
4724	A11
4725	A11
4726	D11
4728	H13
4731	C11
4732	D11
4733	A13
4734	A14
4735	A11
4736	A11
4790	D9
4791	D13
4792	C13
4793	D13
5701	A3
5702	B3
5703	C1
5704	C2
5705	C3
5706	D2
5707	H2
5708	F2
5709	G2
5710	G2
5711	D10
5713	A14
5715	D9
5716	D11
5717	D12
5718	H4
5720	B8
7701	D2
7702	E3
7704	H2
7708	F13
7709	E5
7713	B2
7714	A10
7715	A12
7716	B7

Diversity Small Signal Panel (B3)			
Item	*100HZ INCR ST*	*DS VIRT DLB*	*100HZ DLB*
2728	-	100N	-
2758	-	100N	-
2759	-	100N	-
2760	-	100N	-
2761	-	100N	-
2762	-	100N	-
2763	-	100N	-
2764	-	100N	-
2765	-	100N	-
2790	-	100N	-
3793	10R	100R	10R
3794	10R	100R	10R
3795	10R	100R	10R
3796	10R	100R	10R
4707	10R	-	10R
4708	10R	-	10R
4709	10R	-	10R
4710	JUMP	-	JUMP
4734	-	JUMP	-
4792	-	JUMP	-
4793	-	JUMP	-
5713	-	FXDIND	-
7708	-	SAA4990H	-
7715	-	MSM54V12222A-30JS	-

HOP


B4 HOP
1
2
3
4
5
6
7
V19 Y100
0.5V / div AC
20µs / div
V20 U100
0.5V / div A
20µs / div
F18 Frame Drive +
0.2V / div AC
2ms / div
F20 EW-Drive
0.2V / div AC
2ms / div
L13 Line Drive 1
1V / div AC
5ms / div
S9 VDHOP
2V / div DC
5ms / div
S10 HD100
2V / div DC
50µs / div
FOCUS-R
FOCUS-G
FOCUS-B
FOCUS-FBL
HD100
FOCUS-V
(NOT USED)
B5-134 R-TXT
G-TXT
B5-135 B-TXT
B5-136 FBL-TXT
B5-137
2329 100n
2330 100n
2331 100n
2328 22p
7301
TDA9330H
V21
V20
V19
Y100
U100
V100
FOCUS-FBL
2323 100n
2322 100n
2321 100n
3395 100R
4301
SWITCH
SATUR'N CONTROL COLOUR DIFF MATRIX
CONTRAST AND BRIGHTNESS CONTROL
RGB-INSERTION
WHITE POINT CONTROL
OUTPU AMPL + BUFFE + BLUE STRETC
SAT
CONTR
BRIGHT
WHITE P.
BLACK STRETCH
RGB-YUV MATRIX
PWL + BEAM CURR LIMITER
CONTIN CATHOD CALIBR
6-BITS DAC
FOCUS-R
FOCUS-G
FOCUS-B
3396 100R
3397 100R
3398 100R
2395 100n
2396 100n
2397 100n
SCL
SDA
3320 100R
3321 100R
2309 RES
2310 RES
V22
V23
I²C
HOP
EW
FRAMI
RAMP GENERAT
+8V
+8VG
+8VS
3329 6R8
5301 6u8
5302 6u8
2341 100u
2314 100u
2315 100n
2332 100n
2317 2u2
2318 22n
2307 100n
SYNC+GEO
RGB
BANDGAP
ANAGND
DIGSUP
DIGGND
SUPPLY
VD-HOP
3363 1K
S9
S10
S11
PHI-1 Hsel
PHI-2 SC
START/STOP H-DRIVE
+5VS
3365 4K7
3364 68K
3362 10K
7311 BC847BW
2338 10n
7309
2319 10n
PDTC144EU
3332 RES
3330 3K3
VD100
FOCUS-V
7330 PDTC144EU
HD100
3333 1K
3331 1K
2320 10p
4306 1fh ONLY
1301
CSTCV
14M74
3319 RES
RES 6305
MCL4148
2325 100n
+8VG
3325 RES
3326 RES
3327 100K
6334 MCL4148
3334 2K2
3323 RES
2311 RES
3324 2K2
6306 BZM55-C5V6
6307 1PS76SB10
2398 10n
3336 1K
3337 1K8
2324 10n
+5VC
7324 BC847CW
2335 47u
3335 3K3
3338 6K8
7308 PDTC144EU
3311 100K
2304 10p
6302 MCL4148 RES
3312 RES
VFB
HFB_X-RAY-PROT
DYN-FASE-COR
STAND-BY (POR)
STANDBY-INFO
LDP
B1-79
B1-76
B1/B5-92
B5-146
B1-78

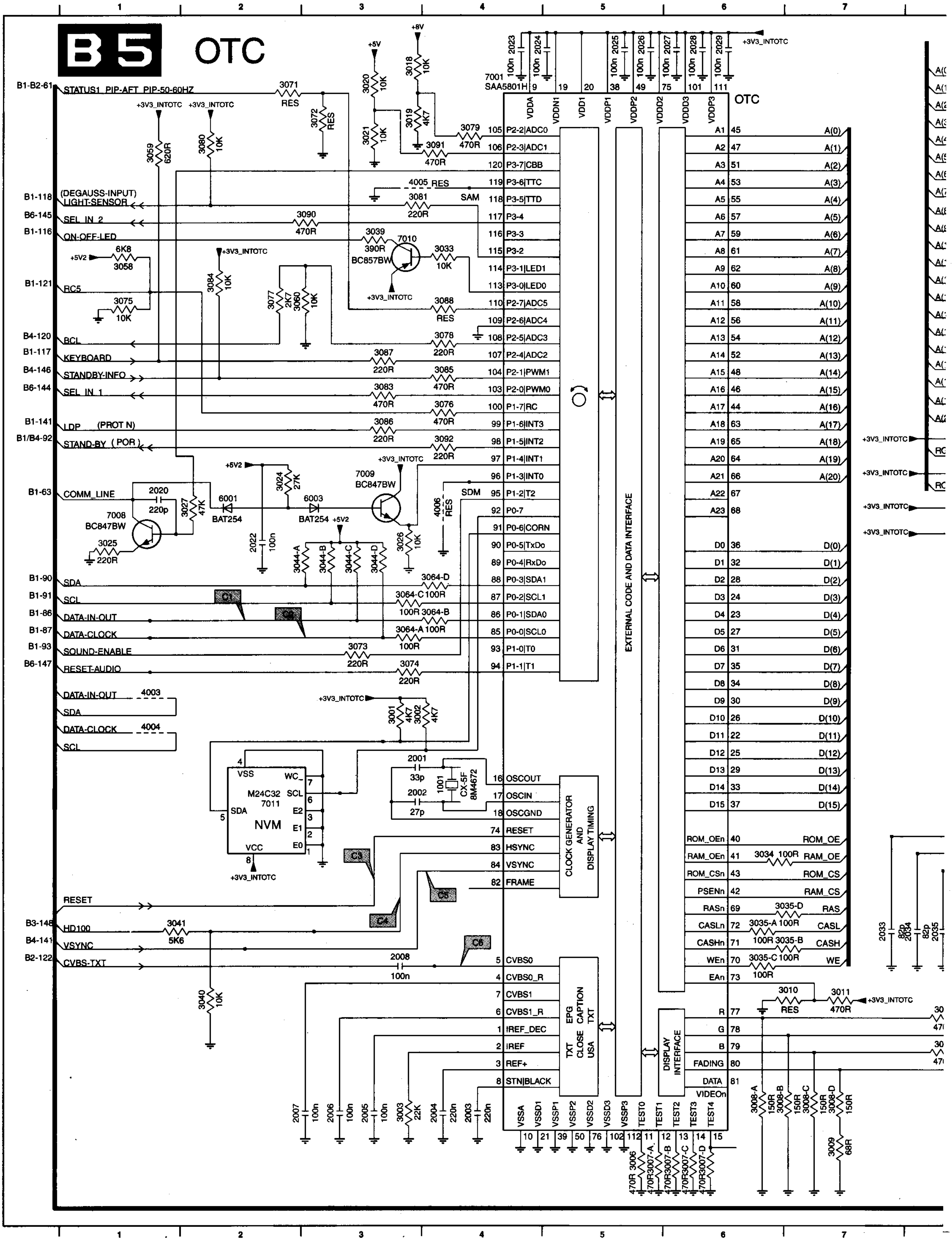
B 4

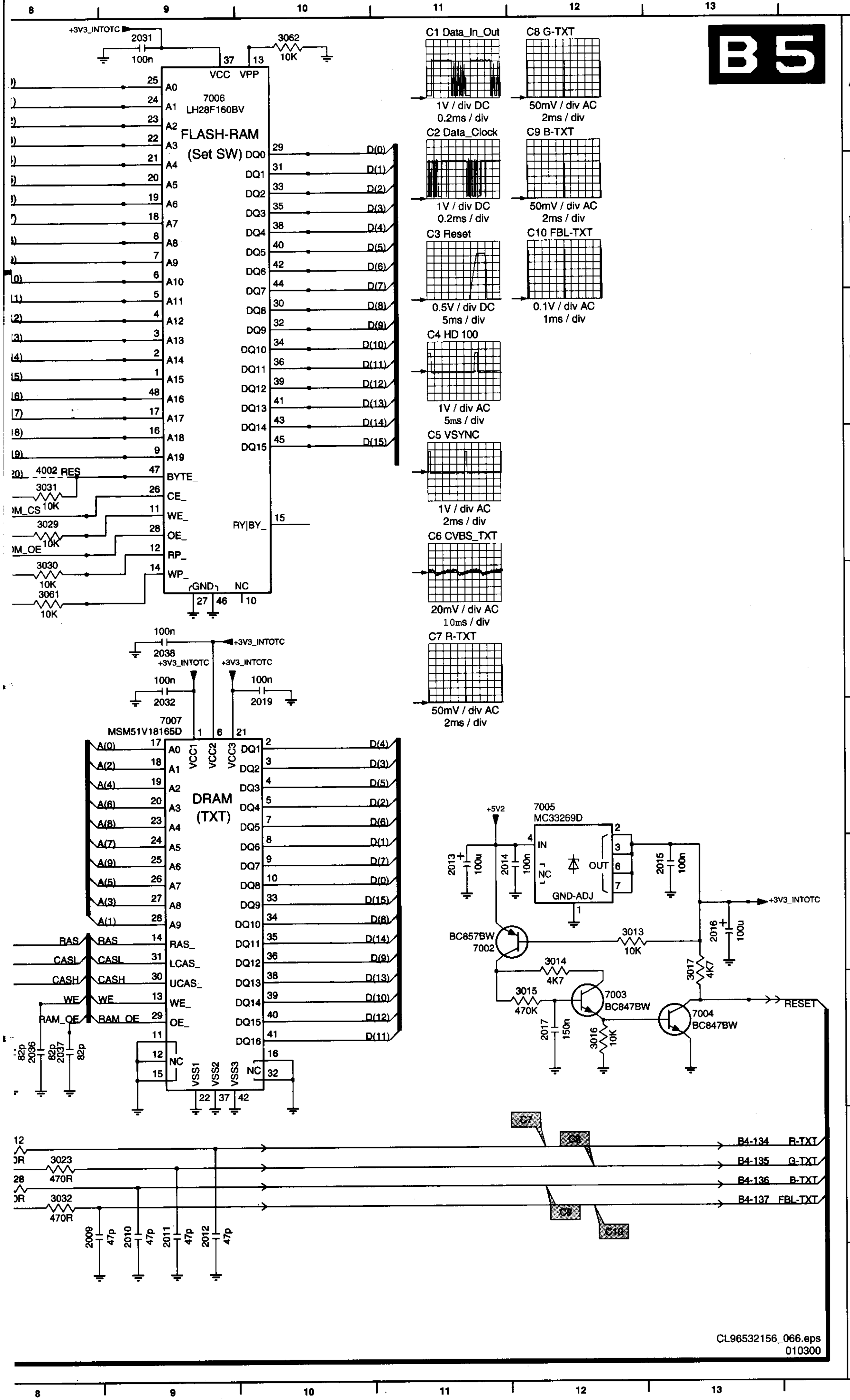

8
9
10
11
12
13
V21 V100
0.5V / div AC
20µs / div
V22 SCL
1V / div DC
0.2ms / div
V23 SDA
1V / div DC
0.2ms / div
B1÷B6
+8VS
3301
10R
7340
BC847BW
3399
10K
BCL
B5-120
V28
3340
100R
R-CRT
B1-67
V29
3341
100R
G-CRT
B1-66
V30
3342
100R
B-CRT
B1-65
40 R
41 G
42 B
CUTOFF
B1-64
RES
6321
MCL4148
3346
33K
3348
2K2
6320
BZX284-C5V6
RES
3350
820R
3349
RES
RES
7306
PDTC144EU
STAND-BY (POR)
B1/B5-92
44 7V3
3345
10K
3347
22K
3343
68K
EHT-INFO
B1-140
6310
BZM55-C6V8
2333
2u2
MCL4148 BZM55-C22
6309
6311
3322
1K
43 2V3
6319
MCL4148
3389
47K
3390
15K
25 0V25
7312
BC847BW
3344
2K2
2334
2u2
2336
2u2
3394
4K7
3388
1K
FRAMEDRIVE+
B1-75
DAC-HOP
B1-77
3310
47K
3 3V5
3306
220R
EW-DRIVE
B1-72
F20
3308
680K
EHT-INFO
B1-74
4 2V3
2303
10n
3307
18K
RES
6301
MCL4148
3309
RES
RES
6318
BZX284-C22
RES
6317
MCL4148
HFB_X-RAY-PROT
B1-73
2339
RES
3392
RES
UL ONLY
2 0V7
1 0V7
3368
RES
3367
1K
4310
F18
VD-HOP
B4-133
VSYNC
B5-142
16 3V9
3328
39K
15 3V8
2313
100n
7310
PDTC144EU
3386
22K
3387
RES
RES
6315
MCL4148
VFB
B1-79
CASE NO FBX
3391
68K
3369
RES
3366
1K
8 1V7
+5VC
3318
1K
4311
B1-71
FRAMEDRIVE-
B1-70
L13
3315
1K
3317
220R
2308
10p
FRAMEDRIVE+
B1-68
857BW
7303
7V5
0V
LINEDRIVE1
B1-69
C001
GND-LINEDRIVE
3313
RES
6303
BZM55-C47
6304
MCL4148
3316
12K
2306
470p
EHT-INFO
B1-139
+5V2
3300
3R9
+5VC
2300
100u
+5V
3304
3R9
+5VS
2340
10u
A
B
C
D
E
F
G
H
I

CL96532156_065.eps
010300

1301	G4
2300	I10
2303	E8
2304	G7
2305	G7
2306	H9
2307	E3
2308	F8
2309	D3
2310	D3
2311	H5
2313	F8
2314	E2
2315	E2
2317	E3
2318	E3
2319	G2
2320	H3
2321	C3
2322	C3
2323	B3
2324	G6
2325	G5
2328	B7
2329	B6
2330	B6
2331	B6
2332	E2
2333	D10
2334	D8
2335	G6
2336	D8
2338	F2
2339	E10
2340	I11
2341	E1
2395	C3
2396	C2
2397	C3
2398	F5
3300	H10
3301	A11
3304	H11
3306	E8
3307	E9
3308	E9
3309	E11
3310	D8
3311	G7
3312	G7
3313	H8
3314	G7
3315	F8
3316	H9
3317	F9
3318	F8
3319	F4
3320	D2
3321	D2
3322	D12
3323	H5
3324	H4
3325	G5
3326	G5
3327	G5
3328	E8
3329	E1
3330	G2
3331	H3
3332	G2
3333	H3
3334	H4
3335	G6
3336	F5
3337	G5
3338	G6
3340	B9
3341	B9
3342	C9
3343	C11
3344	D10
3345	C8
3346	C8
3347	C8
3348	C9
3349	C10
3350	C10
3362	F2
3363	F3
3364	F2
3365	F1
3366	F9
3367	E9
3368	E9
3369	F9
3386	F11
3387	F12
3388	D10
3389	D9
3390	D9
3391	F11
3392	E10
3394	D8
3395	C3
3396	C2
3397	C2
3398	C2
3399	B12
4301	C3
4306	G3
4310	E10
4311	F12
5301	E2
5302	E2
6301	E10
6302	G7
6303	H8
6304	H9
6305	G4
6306	H5
6307	H5
6309	D11
6310	D10
6311	D11
6315	F12
6317	E12
6318	E11
6319	D8
6320	C9
6321	C8
6334	H4
7301	B3
7303	G8
7306	C10
7308	H6
7309	F3
7310	F11
7311	F1
7312	D9
7324	G6
7330	G2
7340	A12
C001	G10

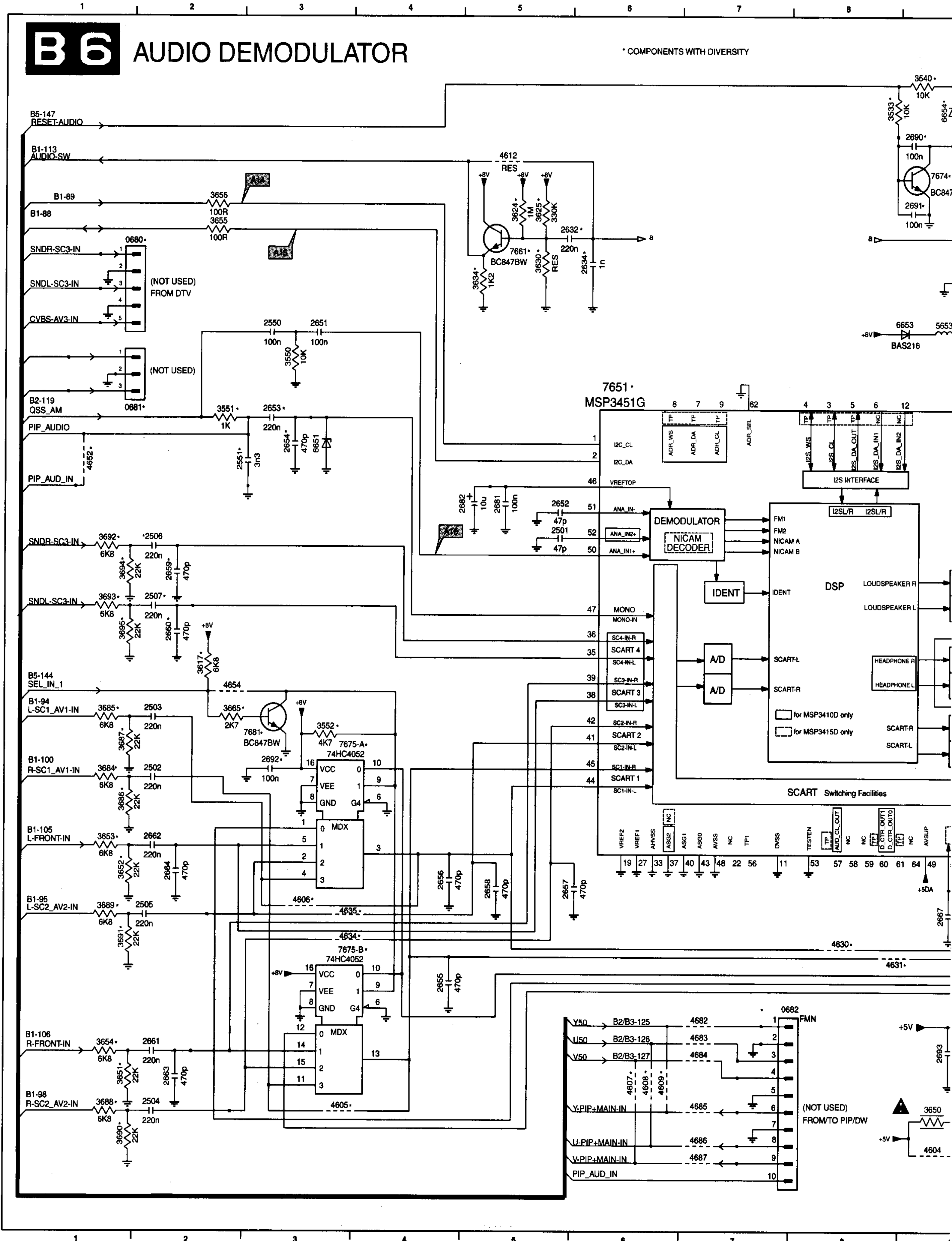
OTC

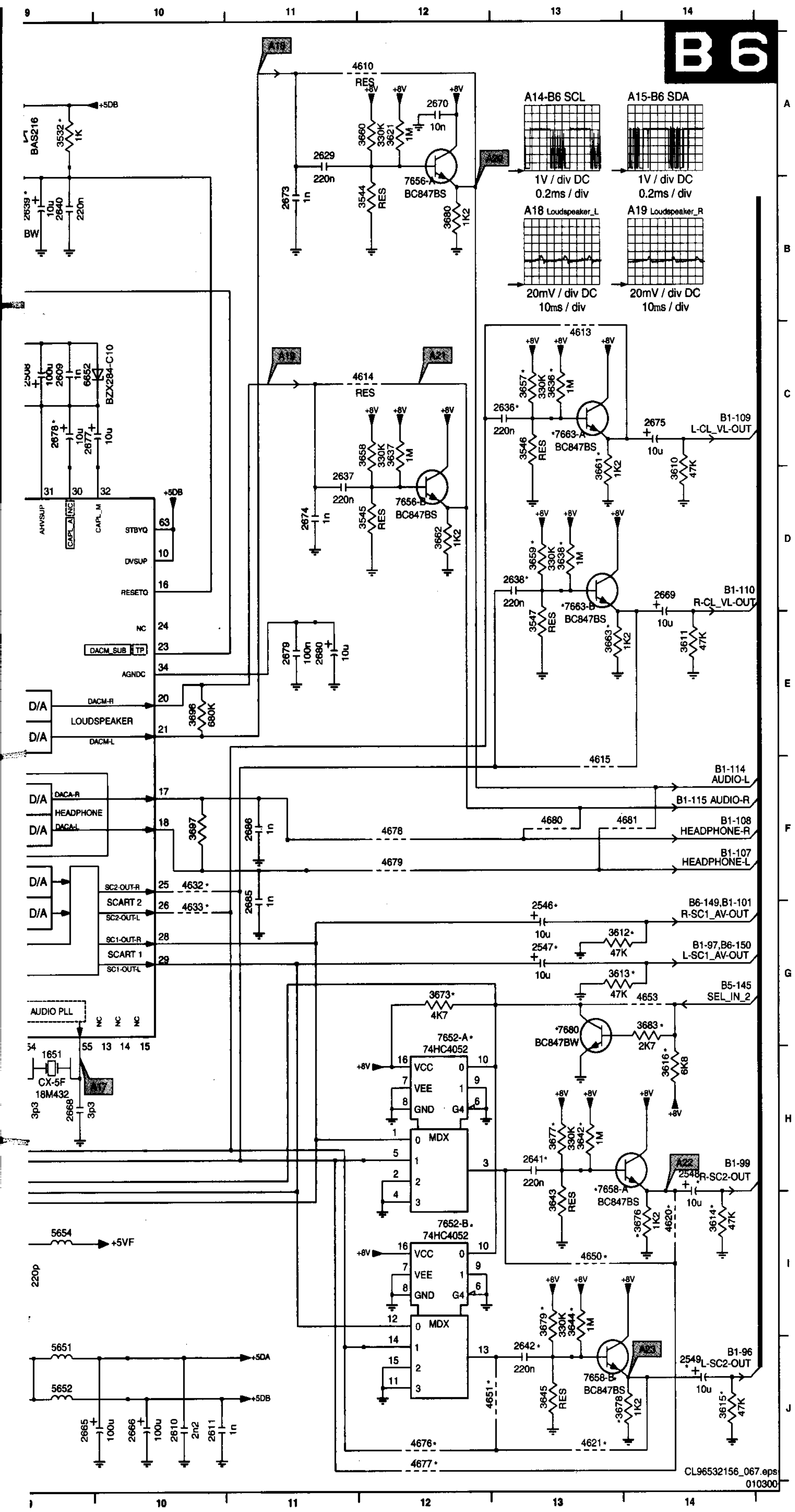

B5
OTC
1
2
3
4
5
6
7
B1-B2-61
STATUS1 PIP-AFT PIP-50-60HZ
3071
RES
3072
RES
+3V3_INTOTC
3059
620R
3080
10K
+5V
3020
10K
3021
10K
+8V
3018
10K
3019
4K7
3079
470R
3091
470R
B1-118
(DEGAUSS-INPUT)
LIGHT-SENSOR
B6-145
SEL_IN_2
3090
470R
B1-116
ON-OFF-LED
4005 RES
3081
220R
SAM
3039
390R
7010
BC857BW
3033
10K
+5V2
6K8
3058
B1-121
RC5
3075
10K
3084
10K
3077
2K7
3060
10K
3088
RES
3078
220R
B4-120
BCL
B1-117
KEYBOARD
3087
220R
B4-146
STANDBY-INFO
3085
470R
B6-144
SEL_IN_1
3083
470R
3076
470R
B1-141
LDP (PROT N)
3086
220R
B1/B4-92
STAND-BY (POR)
3092
220R
3024
27K
7009
BC847BW
B1-63
COMM_LINE
2020
220p
3027
47K
6001
BAT254
6003
BAT254
7008
BC847BW
3025
220R
2022
100n
3044-A
3044-B
3044-C
3044-D
3026
10K
4006
RES
SDM
B1-90
SDA
3064-D
B1-91
SCL
C1
3064-C 100R
B1-86
DATA-IN-OUT
C2
100R 3064-B
B1-87
DATA-CLOCK
3064-A 100R
B1-93
SOUND-ENABLE
3073
220R
100R
B6-147
RESET-AUDIO
3074
220R
DATA-IN-OUT
4003
SDA
DATA-CLOCK
4004
SCL
3001
4K7
3002
4K7
VSS
WC_
M24C32
7011
SCL
SDA
E2
NVM
E1
VCC
E0
2001
33p
1001
CX-5F
8M4672
2002
27p
C3
RESET
C4
C5
B3-148
HD100
3041
5K6
B4-141
VSYNC
B2-122
CVBS-TXT
2008
100n
C6
3040
10K
2007
100n
2006
100n
2005
100n
3003
22K
2004
220n
2003
220n
7001
SAA5801H
2023
2024
2025
2026
2027
2028
2029
100n
+3V3_INTOTC
VDDA
VDDN1
VDD1
VDDP1
VDDP2
VDDD2
VDDD3
VDDP3
OTC
105 P2-2|ADC0
106 P2-3|ADC1
120 P3-7|CBB
119 P3-6|TTC
118 P3-5|TTD
117 P3-4
116 P3-3
115 P3-2
114 P3-1|LED1
113 P3-0|LED0
110 P2-7|ADC5
109 P2-6|ADC4
108 P2-5|ADC3
107 P2-4|ADC2
104 P2-1|PWM1
103 P2-0|PWM0
100 P1-7|RC
99 P1-6|INT3
98 P1-5|INT2
97 P1-4|INT1
96 P1-3|INT0
95 P1-2|T2
92 P0-7
91 P0-6|CORN
90 P0-5|TxDo
89 P0-4|RxDo
88 P0-3|SDA1
87 P0-2|SCL1
86 P0-1|SDA0
85 P0-0|SCL0
93 P1-0|T0
94 P1-1|T1
16 OSCOUT
17 OSCIN
18 OSCGND
74 RESET
83 HSYNC
84 VSYNC
82 FRAME
CLOCK GENERATOR AND DISPLAY TIMING
EXTERNAL CODE AND DATA INTERFACE
5 CVBS0
4 CVBS0_R
7 CVBS1
6 CVBS1_R
1 IREF_DEC
2 IREF
3 REF+
8 STN|BLACK
EPG CAPTION TXT
TXT CLOSE USA
DISPLAY INTERFACE
VSSA
VSSD1
VSSP1
VSSP2
VSSD2
VSSD3
VSSP3
TEST0
TEST1
TEST2
TEST3
TEST4
470R 3006
470R3007-A
470R3007-B
470R3007-C
470R3007-D
A1 45 A(0)
A2 47 A(1)
A3 51 A(2)
A4 53 A(3)
A5 55 A(4)
A6 57 A(5)
A7 59 A(6)
A8 61 A(7)
A9 62 A(8)
A10 60 A(9)
A11 58 A(10)
A12 56 A(11)
A13 54 A(12)
A14 52 A(13)
A15 48 A(14)
A16 46 A(15)
A17 44 A(16)
A18 63 A(17)
A19 65 A(18)
A20 64 A(19)
A21 66 A(20)
A22 67
A23 68
D0 36 D(0)
D1 32 D(1)
D2 28 D(2)
D3 24 D(3)
D4 23 D(4)
D5 27 D(5)
D6 31 D(6)
D7 35 D(7)
D8 34 D(8)
D9 30 D(9)
D10 26 D(10)
D11 22 D(11)
D12 25 D(12)
D13 29 D(13)
D14 33 D(14)
D15 37 D(15)
ROM_OEn 40 ROM_OE
RAM_OEn 41 3034 100R RAM_OE
ROM_CSn 43 ROM_CS
PSENn 42 RAM_CS
RASn 69 3035-D RAS
CASLn 72 3035-A 100R CASL
CASHn 71 100R 3035-B CASH
WEn 70 3035-C 100R WE
EAn 73 100R
3010
RES
3011
470R
R 77
G 78
B 79
FADING 80
DATA 81
VIDEOn
3008-A 150R
3008-B 150R
3008-C 150R
3008-D 150R
3009
68R
2033
82p
2034
82p
2035
RC


B5
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
J
+3V3_INTOTC
2031
100n
3062
10K
37
13
VCC
VPP
7006
LH28F160BV
FLASH-RAM
(Set SW)
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
BYTE_
CE_
WE_
OE_
RP_
WP_
GND
NC
27
46
10
DQ0
DQ1
DQ2
DQ3
DQ4
DQ5
DQ6
DQ7
DQ8
DQ9
DQ10
DQ11
DQ12
DQ13
DQ14
DQ15
RY|BY_
15
D(0)
D(1)
D(2)
D(3)
D(4)
D(5)
D(6)
D(7)
D(8)
D(9)
D(10)
D(11)
D(12)
D(13)
D(14)
D(15)
4002 RES
3031
10K
3029
10K
3030
10K
3061
10K
C1 Data_In_Out
1V / div DC
0.2ms / div
C2 Data_Clock
1V / div DC
0.2ms / div
C3 Reset
0.5V / div DC
5ms / div
C4 HD 100
1V / div AC
5ms / div
C5 VSYNC
1V / div AC
2ms / div
C6 CVBS_TXT
20mV / div AC
10ms / div
C7 R-TXT
50mV / div AC
2ms / div
C8 G-TXT
50mV / div AC
2ms / div
C9 B-TXT
50mV / div AC
2ms / div
C10 FBL-TXT
0.1V / div AC
1ms / div
100n
2038
+3V3_INTOTC
100n
2032
100n
2019
7007
MSM51V18165D
VCC1
VCC2
VCC3
DRAM
(TXT)
A(0)
A(2)
A(4)
A(6)
A(8)
A(7)
A(9)
A(5)
A(3)
A(1)
RAS
CASL
CASH
WE
RAM_OE
RAS_
LCAS_
UCAS_
WE_
OE_
NC
VSS1
VSS2
VSS3
22
37
42
DQ1
DQ2
DQ3
DQ4
DQ5
DQ6
DQ7
DQ8
DQ9
DQ10
DQ11
DQ12
DQ13
DQ14
DQ15
DQ16
D(4)
D(3)
D(5)
D(2)
D(6)
D(1)
D(7)
D(0)
D(15)
D(8)
D(14)
D(9)
D(13)
D(10)
D(12)
D(11)
2036
82p
2037
82p
+5V2
7005
MC33269D
IN
NC
OUT
GND-ADJ
2013
100u
2014
100n
2015
100n
2016
100u
BC857BW
7002
3013
10K
3014
4K7
3015
470K
2017
150n
3016
10K
3017
4K7
7003
BC847BW
7004
BC847BW
RESET
3023
470R
3032
470R
2009
47p
2010
47p
2011
47p
2012
47p
B4-134
R-TXT
B4-135
G-TXT
B4-136
B-TXT
B4-137
FBL-TXT
CL96532156_066.eps
010300

1001	G4
2001	G3
2002	G3
2003	J4
2004	J4
2005	J3
2006	J3
2007	J2
2008	H3
2009	I8
2010	I9
2011	I9
2012	I9
2013	G11
2014	G11
2015	G13
2016	G13
2017	H12
2019	E10
2020	D1
2022	E2
2023	A4
2024	A4
2025	A5
2026	A5
2027	A6
2028	A6
2029	A6
2031	A9
2032	E9
2033	H7
2034	H8
2035	H8
2036	H8
2037	H8
2038	E9
3001	F3
3002	F3
3003	J3
3006	J5
3007-A	J5
3007-B	J6
3007-C	J6
3007-D	J6
3008-A	I6
3008-B	I6
3008-C	I7
3008-D	I7
3009	J7
3010	I7
3011	I7
3012	I8
3013	G12
3014	G12
3015	H12
3016	H12
3017	G13
3018	A3
3019	A3
3020	A3
3021	A3
3023	I8
3024	D2
3025	E1
3026	E3
3027	E2
3028	I8
3029	D8
3030	E8
3031	D8
3032	I8
3033	B4
3034	G6
3035-A	H6
3035-B	H7
3035-C	H6
3035-D	H7
3039	B3
3040	I2
3041	H1
3044-A	E2
3044-B	E3
3044-C	E3
3044-D	E3
3058	C1
3059	B1
3060	C2
3061	E8
3062	A10
3064-A	F3
3064-B	E4
3064-C	E3
3064-D	E4
3071	A2
3072	A3
3073	F3
3074	F3
3075	C1
3076	D4
3077	C2
3078	C4
3079	A4
3080	B2
3081	B3
3083	D3
3084	C2
3085	C4
3086	D3
3087	C3
3088	C4
3090	B3
3091	B4
3092	D4
4002	D8
4003	F1
4004	F1
4005	B3
4006	E4
6001	E2
6003	E3
7001	A4
7002	G11
7003	H12
7004	H13
7005	F12
7006	A9
7007	F9
7008	E1
7009	D3
7010	B3
7011	G2

Audio demodulator


B6 AUDIO DEMODULATOR
* COMPONENTS WITH DIVERSITY
B5-147 RESET-AUDIO
B1-113 AUDIO-SW
B1-89
B1-88
SNDR-SC3-IN
SNDL-SC3-IN
CVBS-AV3-IN
0680*
(NOT USED) FROM DTV
(NOT USED)
0681*
B2-119 QSS_AM
PIP_AUDIO
PIP_AUD_IN
4652*
3656 100R
3655 100R
A14
A15
A16
4612 RES
+8V
3624* 1M
3625* 330K
7661* BC847BW
3634* 1K2
3630* RES
2632* 220n
2634* 1n
a
2550 100n
2651 100n
3550 10K
3551* 1K
2653* 220n
2551* 3n3
2654* 470p
6651
7651* MSP3451G
I2C_CL
I2C_DA
VREFTOP
ANA_IN-
ANA_IN2+
ANA_IN1+
ADR_WS
ADR_DA
ADR_CL
ADR_SEL
TP
NC
I2S_WS
I2S_CL
I2S_DA_OUT
I2S_DA_IN1
I2S_DA_IN2
I2S INTERFACE
I2SL/R
2682 10u
2681 100n
2652 47p
2501 47p
DEMODULATOR
NICAM DECODER
IDENT
FM1
FM2
NICAM A
NICAM B
DSP
LOUDSPEAKER R
LOUDSPEAKER L
HEADPHONE R
HEADPHONE L
SCART-R
SCART-L
A/D
MONO
MONO-IN
SC4-IN-R
SCART 4
SC4-IN-L
SC3-IN-R
SCART 3
SC3-IN-L
SC2-IN-R
SCART 2
SC2-IN-L
SC1-IN-R
SCART 1
SC1-IN-L
for MSP3410D only
for MSP3415D only
SCART Switching Facilities
VREF2
VREF1
AHVSS
ASG2
ASG1
ASG0
AVSS
TP1
DVSS
TESTEN
AUD_CL_OUT
D_CTR_OUT1
D_CTR_OUT0
AVSUP
+5DA
2667
3692* 6K8
*2506 220n
3694* 22K
2659* 470p
3693* 6K8
2507* 220n
3695* 22K
2660* 470p
3617* 6K8
B5-144 SEL_IN_1
4654
3665* 2K7
7681* BC847BW
3552* 4K7
7675-A* 74HC4052
2692* 100n
VCC
VEE
GND
G4
MDX
B1-94 L-SC1_AV1-IN
3685* 6K8
2503 220n
3687* 22K
B1-100 R-SC1_AV1-IN
3684* 6K8
2502 220n
3686* 22K
B1-105 L-FRONT-IN
3653* 6K8
2662 220n
3652* 22K
2664 470p
2656 470p
2658 470p
2657 470p
B1-95 L-SC2_AV2-IN
3689* 6K8
2505 220n
3691* 22K
4606*
4635*
4634*
4630*
4631*
7675-B* 74HC4052
2655 470p
B1-106 R-FRONT-IN
3654* 6K8
2661 220n
3651* 22K
2663 470p
B1-98 R-SC2_AV2-IN
3688* 6K8
2504 220n
3690* 22K
4605*
Y50 B2/B3-125 4682
U50 B2/B3-126 4683
V50 B2/B3-127 4684
4607*
4608*
4609*
Y-PIP+MAIN-IN 4685
U-PIP+MAIN-IN 4686
V-PIP+MAIN-IN 4687
PIP_AUD_IN
0682 FMN
(NOT USED) FROM/TO PIP/DW
3540* 10K
3533* 10K
6654*
2690* 100n
7674* BC847
2691* 100n
6653 BAS216
5653
+5V
2693
3650
4604
1 2 3 4 5 6 7 8


B 6
A14-B6 SCL
A15-B6 SDA
1V / div DC
0.2ms / div
A18 Loudspeaker_L
A19 Loudspeaker_R
20mV / div DC
10ms / div
7656-A BC847BS
7656-B BC847BS
7663-A BC847BS
7663-B BC847BS
7658-A BC847BS
7658-B BC847BS
7680 BC847BW
7652-A 74HC4052
7652-B 74HC4052
MDX
B1-109 L-CL_VL-OUT
B1-110 R-CL_VL-OUT
B1-114 AUDIO-L
B1-115 AUDIO-R
B1-108 HEADPHONE-R
B1-107 HEADPHONE-L
B6-149,B1-101 R-SC1_AV-OUT
B1-97,B6-150 L-SC1_AV-OUT
B5-145 SEL_IN_2
B1-99 R-SC2-OUT
B1-96 L-SC2-OUT
D/A
LOUDSPEAKER
HEADPHONE
SCART 2
SCART 1
AUDIO PLL
DACM-R
DACM-L
DACA-R
DACA-L
STBYQ
DVSUP
RESETQ
AGNDC
AHVSUP
CAPL_A
CAPL_M
DACM_SUB
BZX284-C10
BA3216
1651 CX-5F 18M432
+5DB
+5DA
+5VF
+8V
CL96532156_067.eps
010300

0680	B1
0681	D1
0682	I7
1651	H9
2501	E5
2502	G2
2503	F2
2504	J2
2505	H2
2506	E2
2507	E2
2508	C9
2546	G13
2547	G13
2548	H14
2549	J14
2550	C3
2551	D2
2609	C9
2610	J10
2611	J10
2629	A11
2632	B5
2634	B6
2636	C13
2637	D11
2638	D13
2639	B9
2640	B9
2641	H13
2642	J13
2651	C3
2652	E5
2653	D3
2654	D3
2655	H4
2656	H4
2657	H5
2658	H5
2659	E2
2660	F2
2661	I2
2662	G2
2663	I2
2664	H2
2665	J9
2666	J10
2667	H9
2668	H9
2669	D14
2670	A12
2673	B11
2674	D11
2675	C14
2677	C9
2678	C9
2679	E11
2680	E11
2681	D5
2682	D5
2685	F11
2686	F11
2690	A9
2691	B9
2692	G3
2693	I9
3532	A9
3533	A8
3540	A9
3544	B12
3545	D12
3546	C13
3547	E13
3550	C3
3551	D2
3552	F3
3610	C14
3611	E14
3612	G13
3613	G13
3614	I14
3615	J14
3616	H14
3617	F2
3621	A12
3624	B5
3625	B5
3630	B5
3634	C5
3636	C13
3637	C12
3638	D13
3642	H13
3643	I13
3644	I13
3645	J13
3650	J9
3651	I1
3652	H1
3653	G1
3654	I1
3655	B2
3656	B2
3657	C13
3658	C12
3659	D13
3660	A12
3661	C13
3662	D12
3663	E13
3665	F2
3673	G12
3676	I14
3677	H13
3678	J13
3679	I13
3680	B12
3683	G14
3684	G1
3685	F1
3686	G1
3687	F1
3688	J1
3689	H1
3690	J1
3691	H1
3692	E1
3693	E1
3694	E1
3695	F1
3696	E10
3697	F10
4604	J9
4605	J3
4606	H3
4607	I6
4608	I6
4609	I6
4610	A12
4612	B5
4613	B13
4614	C12
4615	F13
4620	I14
4621	J13
4630	H8
4631	H8
4632	F10
4633	G10
4634	H3
4635	H3
4650	I13
4651	J13
4652	D1
4653	G14
4654	F2
4676	J12
4677	J12
4678	F12
4679	F12
4680	F13
4681	F14
4682	I7
4683	I7
4684	I7
4685	J7
4686	J7
4687	J7
5651	J9
5652	J9
5653	C9
5654	I9
6651	D3
6652	C9
6653	C9
6654	A9
7651	D6
7652-A	G12
7652-B	I12
7656-A	B12
7656-B	D12
7658-A	I13
7658-B	J13
7661	B5
7663-A	C13
7663-B	D13
7674	B9
7675-A	G4
7675-B	H4
7680	G13
7681	F3

Diversity Small Signal Panel (B6)			
Item	100HZ INCR ST	DS VIRT DLB	100HZ DLB
2636	220N	-	-
2638	220N	-	-
2641	220N	-	-
2642	220N	-	-
2663	-	470P	470P
2664	-	470P	470P
2677	2U2	10U	10U
2678	-	10U	10U
2678	-	10U	10U
2685	-	1N	1N
2686	-	1N	1N
2692	100N	-	-
3552	4K7	-	-
3617	6K8	-	-
3636	1M	-	-
3638	1M	-	-
3642	1M	-	-
3644	1M	-	-
3657	330K	-	-
3659	330K	-	-
3661	1K2	-	-
3663	1K2	-	-
3665	2K7	-	-
3676	1K2	-	-
3677	330K	-	-
3678	1K2	-	-
3679	330K	-	-
4605	-	JUMP	JUMP
4606	-	JUMP	JUMP
4613	-	JUMP	JUMP
4615	-	JUMP	JUMP
4620	-	JUMP	JUMP
4621	-	JUMP	JUMP
4630	JUMP	-	-
4631	JUMP	-	-
4632	-	JUMP	JUMP
4633	-	JUMP	JUMP
4634	-	JUMP	JUMP
4635	-	JUMP	JUMP
4650	-	JUMP	JUMP
4651	-	JUMP	JUMP
4678	-	JUMP	JUMP
4679	-	JUMP	JUMP
4680	JUMP	-	-
4681	JUMP	-	-
7651	MSP3415D-FH-B3	MSP3451G-FH-A1	MSP3451G-FH-A1
7658	BC847BS	-	-
7663	BC847BS	-	-
7675	74HC4052PW	-	-
7681	BC847BW	-	-

SSP (LOT side overview)

1 2 3

A

B

Part 1

CL96532156_043.pdf
140200

Part 2

CL96532156_044.pdf
140200

C

D

Part 3

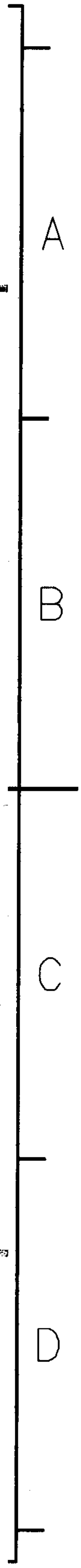
CL96532156_045.pdf
140200

Part 4

CL96532156_046.pdf
140200

1 2 3

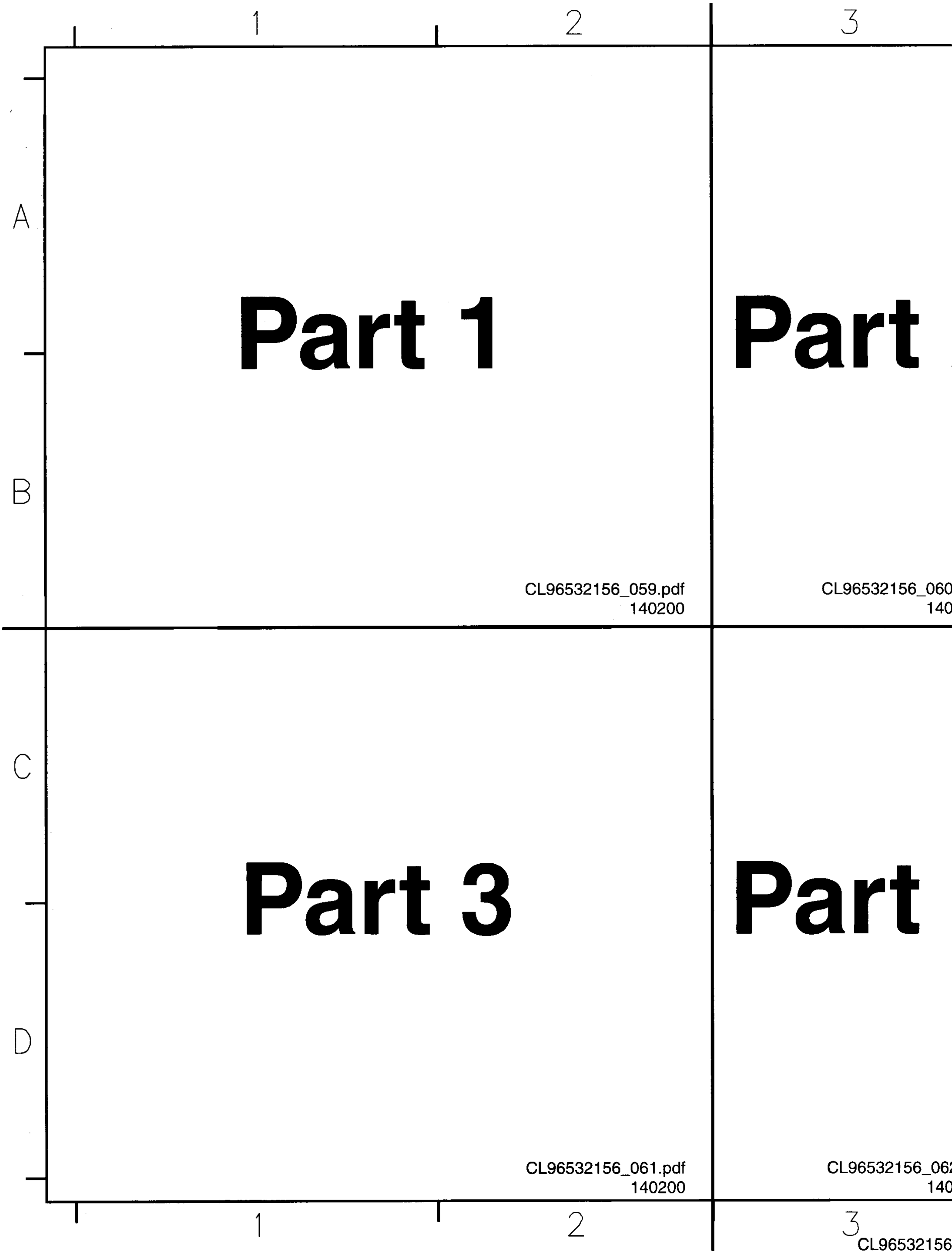
CL96532156_053.ep
1402

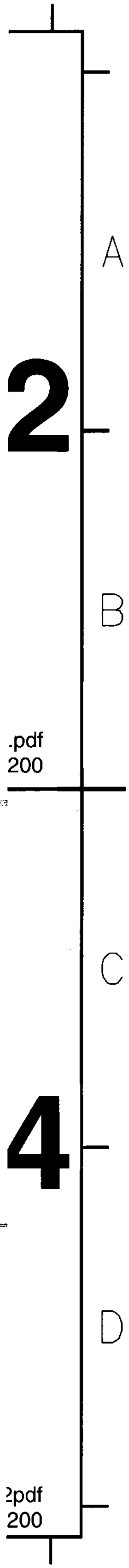


1000	B1
1001	B3
1305	A2
1308	A2
1407	A1
1409	A2
2001	A3
2002	A3
2004	B3
2005	B3
2006	B3
2007	B3
2009	B3
2010	B3
2011	B3
2012	B3
2013	A3
2016	A3
2019	A3
2020	B3
2023	B3
2025	A3
2026	B3
2027	B3
2028	A3
2029	B3
2032	A3
2033	A3
2034	A3
2035	A3
2036	A3
2037	A3
2300	B1
2314	B1
2315	B2
2317	B2
2318	B2
2332	B2
2335	B2
2336	B2
2340	B2
2341	B2
2350	B1
2351	B1
2352	B1
2356	B2
2357	B2
2358	A2
2365	A1
2367	A1
2368	A1
2376	B2
2377	B2
2398	B2
2406	A2
2407	A2
2408	A2
2409	A2
2410	A2
2411	A2
2417	A2
2418	A2
2501	D2
2506	C2
2507	C2
2508	D2
2546	D1
2547	C1
2548	C1
2549	C1
2550	C2
2609	D2
2636	D2
2638	D1
2639	D2
2641	D1
2642	C1
2651	D2
2665	D2
2666	D2
2669	D1
2675	D1
2677	D2
2678	D2
2680	D2
2682	D2
2690	D2
2691	D2
2692	C1
2693	D1
2702	D3
2703	D2
2704	C3
2706	C3
2708	C2
2709	C3
2713	D3
2729	C2
2733	C3
2738	C3
2743	C3
2757	C3
2765	D3
2767	C3
2771	C3
2772	C3
2773	C3
2774	D3
2776	C3
2785	C3
2790	D3
2796	C3
2797	D3
2798	C3
3003	B3
3010	B3
3011	B3
3012	B3
3018	B3
3019	B3
3020	B3
3021	B3
3023	B3
3024	B3
3025	B3
3026	B3
3027	B3
3028	B3
3029	A3
3032	B3
3033	B3
3034	A3
3035	A3
3039	B3
3041	B3
3058	B3
3059	B3
3062	A3
3071	B3
3072	B3
3073	B3
3074	B3
3075	B3
3076	B3
3078	B3
3079	B3
3080	B3
3081	B3
3083	B3
3084	B3
3085	B3
3086	B3
3087	B3
3088	B3
3090	B3
3091	B3
3092	B3
3300	B1
3301	B2
3304	B2
3317	B1
3318	B2
3329	B1
3335	B2
3338	B2
3370	A1
3376	B2
3377	B2
3393	A2
3394	B2
3399	B2
3400	B2
3406	A2
3411	A2
3414	A2
3417	A2
3418	A2
3437	A2
3532	D2
3533	D2
3540	D2
3546	D2
3547	D1
3550	C2
3552	C1
3610	D1
3611	D1
3612	D1
3613	C1
3614	C1
3615	C1
3616	C2
3617	C2
3636	D2
3638	D1
3642	D2
3643	D1
3644	D2
3645	D1
3650	D1
3657	D2
3659	D1
3661	D1
3663	D1
3665	C2
3676	D2
3677	D1
3678	D2
3679	D1
3683	C2
3692	C2
3693	C2
3694	C2
3695	C2
3697	D2
3702	D3
3703	C3
3704	C3
3705	C3
3706	C3
3714	C2
3716	C2
3717	C2
3728	C3
3733	C3
3739	D3
3755	C3
3757	C3
3759	C3
3790	D3
3791	D3
3792	D3
3797	D3
4311	B1
4322	A1
4326	B2
4605	C2
4606	C2
4607	C2
4608	C2
4609	C2
4613	D2
4615	D1
4632	D2
4633	D2
4653	C2
4654	C2
4678	D2
4679	D2
4682	C2
4683	C2
4684	C2
4685	C2
4686	C2
4687	C2
4720	D3
4721	D3
4722	B3
4723	D3
4726	D3
4731	D3
4732	D3
4733	D3
4734	D3
4791	D3
4792	D3
4793	D3
5010	C1
5011	C1
5012	B1
5013	B1
5014	B1
5015	C1
5016	C1
5017	B1
5018	C1
5019	C1
5020	C1
5021	B1
5301	B2
5302	B2
5403	A2
5405	B2
5407	A2
5653	D2
5654	D1
5702	C2
5707	C2
5711	D3
5713	D3
5715	D3
5716	D3
5717	D3
5911	C1
5912	C1
5913	C1
5914	C1
5915	C1
5916	C1
5917	C1
5918	C1
5919	C1
5920	D1
5921	D1
5922	D1
5923	D1
5924	D1
5925	D1
5926	D1
5927	C1
5928	D1
5929	D1
5930	D1
5931	A1
5932	B1
5933	B1
5934	A1
5935	B1
6001	B3
6003	B3
6403	A2
6652	D2
6653	D2
6654	D2
7001	B3
7007	A3
7008	B3
7009	B3
7010	B3
7323	A2
7340	B2
7403	A2
7658	D2
7663	D1
7674	D2
7675	C2
7680	C2
7681	C2
7704	C3
7709	C3
7714	D3
7715	D3

CL96532156_042.eps
180200

SSP (tuner side overview)


1
2
3
A
B
C
D
Part 1
Part
CL96532156_059.pdf
140200
CL96532156_060
140
Part 3
Part
CL96532156_061.pdf
140200
CL96532156_06
140
1
2
3
CL96532156



_047.eps
140200

0302	A2
0680	D2
0681	C2
0682	D2
1301	B2
1408	A2
1651	D2
1701	C1
2003	B1
2008	B1
2014	A2
2015	A1
2017	A1
2022	A2
2024	B1
2031	A1
2038	A1
2303	B2
2304	B2
2305	B3
2306	B3
2307	B2
2308	B2
2309	B2
2310	B2
2311	B2
2313	B2
2319	B2
2320	B2
2321	B2
2322	B2
2323	B2
2324	B2
2325	B2
2328	B2
2329	B2
2330	B2
2331	B2
2333	B2
2334	B2
2338	B2
2339	B3
2359	A2
2360	A2
2361	A2
2362	A2
2366	A3
2369	B3
2370	B3
2371	A2
2372	A2
2373	A3
2374	A2
2375	A2
2378	A2
2384	A3
2395	A2
2396	A2
2397	A2
2412	A2
2413	A3
2420	B3
2502	C3
2503	C2
2504	C2
2505	C2
2551	C2
2610	D2
2611	D2
2629	D2
2632	D2
2634	D2
2637	D2
2640	D2
2652	D2
2653	C2
2654	C2
2655	D2
2656	C2
2657	C2
2658	C2
2659	C2
2660	C2
2661	C2
2662	C2
2663	C2
2664	C2
2667	D2
2668	D2
2670	D3
2673	D2
2674	D2
2679	D2
2681	D2
2685	D2
2686	D2
2707	C1
2710	C1
2712	C1
2717	C1
2718	C2
2719	C1
2720	C1
2721	C1
2723	C1
2724	C1
2725	C2
2726	C1
2728	D1
2730	C1
2731	C1
2747	C1
2748	C1
2755	C1
2756	C1
2758	D1
2759	D1
2760	D1
2761	D1
2762	D1
2763	D1
2764	D1
2766	C1
2770	C1
2786	D1
2788	C1
2792	D1
2795	D2
2900	C3
2901	C3
2902	C3
2903	C3
2904	C3
2905	C3
2906	B3
2907	C3
2908	C3
2909	C3
2910	C3
2911	C3
2912	C3
2913	C3
2914	C3
2915	C3
2916	C3
2917	C3
3001	B1
3002	B1
3006	B1
3007	B1
3008	B1
3009	B1
3013	A1
3014	A2
3015	A1
3016	A1
3017	A1
3030	A1
3031	A1
3040	B1
3044	B1
3060	B2
3061	A1
3064	B1
3077	B2
3306	B2
3307	B2
3308	B3
3309	B3
3310	B3
3311	B2
3312	B3
3313	B3
3314	B2
3315	B3
3316	B3
3319	B2
3320	B2
3321	B2
3322	B2
3323	B2
3324	A2
3325	B2
3326	B2
3327	A2
3328	B2
3330	B2
3331	B2
3332	B2
3333	B2
3334	B2
3336	B2
3337	B3
3340	B2
3341	B2
3342	B2
3343	B2
3344	B2
3345	B2
3346	B3
3347	B3
3348	B3
3349	B3
3350	B3
3362	B2
3363	B2
3364	B2
3365	A2
3366	B2
3367	B2
3368	B2
3369	B2
3371	A3
3372	B3
3378	A2
3382	A2
3384	A2
3385	A3
3386	B3
3387	B3
3388	B2
3389	B2
3390	B2
3391	B2
3392	B3
3395	A2
3396	A2
3397	A2
3398	A2
3415	A2
3416	A3
3419	A3
3435	A3
3436	A2
3439	A2
3441	A2
3445	A2
3446	B3
3544	D3
3545	D3
3551	C2
3621	D3
3624	D3
3625	D3
3630	D3
3634	D3
3637	D3
3651	C2
3652	C2
3653	C2
3654	C2
3655	D2
3656	D2
3658	D3
3660	D3
3662	D3
3673	C3
3680	D3
3684	C3
3685	C2
3686	C3
3687	C2
3688	C2
3689	C2
3690	C2
3691	C2
3696	D2
3707	C1
3708	C1
3709	C1
3710	C1
3711	C1
3712	C1
3713	C1
3718	C1
3719	C1
3720	C1
3721	C1
3722	C1
3725	C1
3730	C1
3731	C1
3732	C1
3740	C1
3741	C1
3744	C1
3745	C1
3746	D1
3747	C2
3748	C2
3749	C2
3754	C1
3793	D1
3794	D1
3795	D1
3796	C1
3798	C1
4002	A1
4003	B1
4004	B1
4005	B1
4006	A1
4301	B2
4306	B2
4310	B3
4604	D3
4610	D3
4612	D2
4614	D2
4620	D2
4621	C2
4630	C3
4631	D3
4634	C2
4635	C2
4650	D2
4651	C2
4652	C2
4676	C2
4677	D2
4680	D3
4681	D3
4703	C1
4707	D1
4708	D1
4709	D1
4710	D1
4711	C1
4724	D1
4725	D1
4728	D1
4735	D1
4736	D1
4790	D1
5404	A2
5406	A3
5408	A2
5409	B3
5410	A2
5651	D3
5652	D3
5701	D1
5703	D1
5704	C1
5705	C1
5706	C1
5708	C1
5709	C1
5710	C1
5718	C1
5720	C1
6301	B3
6302	B2
6303	B3
6304	B3
6305	B3
6306	A2
6307	A2
6309	B2
6310	B2
6311	B2
6315	B3
6317	B3
6318	B3
6319	B2
6320	B3
6321	B2
6334	B2
6651	C2
7002	A2
7003	A2
7004	B1
7005	A1
7006	A1
7011	B1
7301	B2
7303	B2
7306	B3
7308	B2
7309	B2
7310	B2
7311	A2
7312	B2
7320	B3
7322	A2
7324	B2
7330	A2
7407	A3
7411	A3
7651	D2
7652	D3
7656	D3
7661	D3
7701	C1
7702	C1
7708	D1
7713	C1
7716	C1

CL96532156_048.eps
180200

CRT panel

0031 E5
0224 E1
0235 A6
0298-A E8
0298-B E8
0298-C C6
0298-D C6
0298-E C6
0298-F D6

0298-G D6
0298-H E6
0298-I E9
0298-K E9
0334 F10
0340 B1
0383 B6
2300 A4
2301 A1

2302 A2
2303 A4
2304 A4
2305 B2
2306 B2
2307 B4
2308 C2
2309 C4
2310 C2

2312 D2
2313 E2
2315 B1
2316 E2
2317 F9
2318 E7
2320 E3
2321 D2
2322 E2

2323 E2
2324 F9
2325 A3
3300 A1
3301 A4
3302 A2
3303 A3
3304 A5
3305 A2

3306 A3
3307 B2
3308 B5
3309 B4
3310 B6
3311 B2
3312 B3
3313 B3
3314 B3

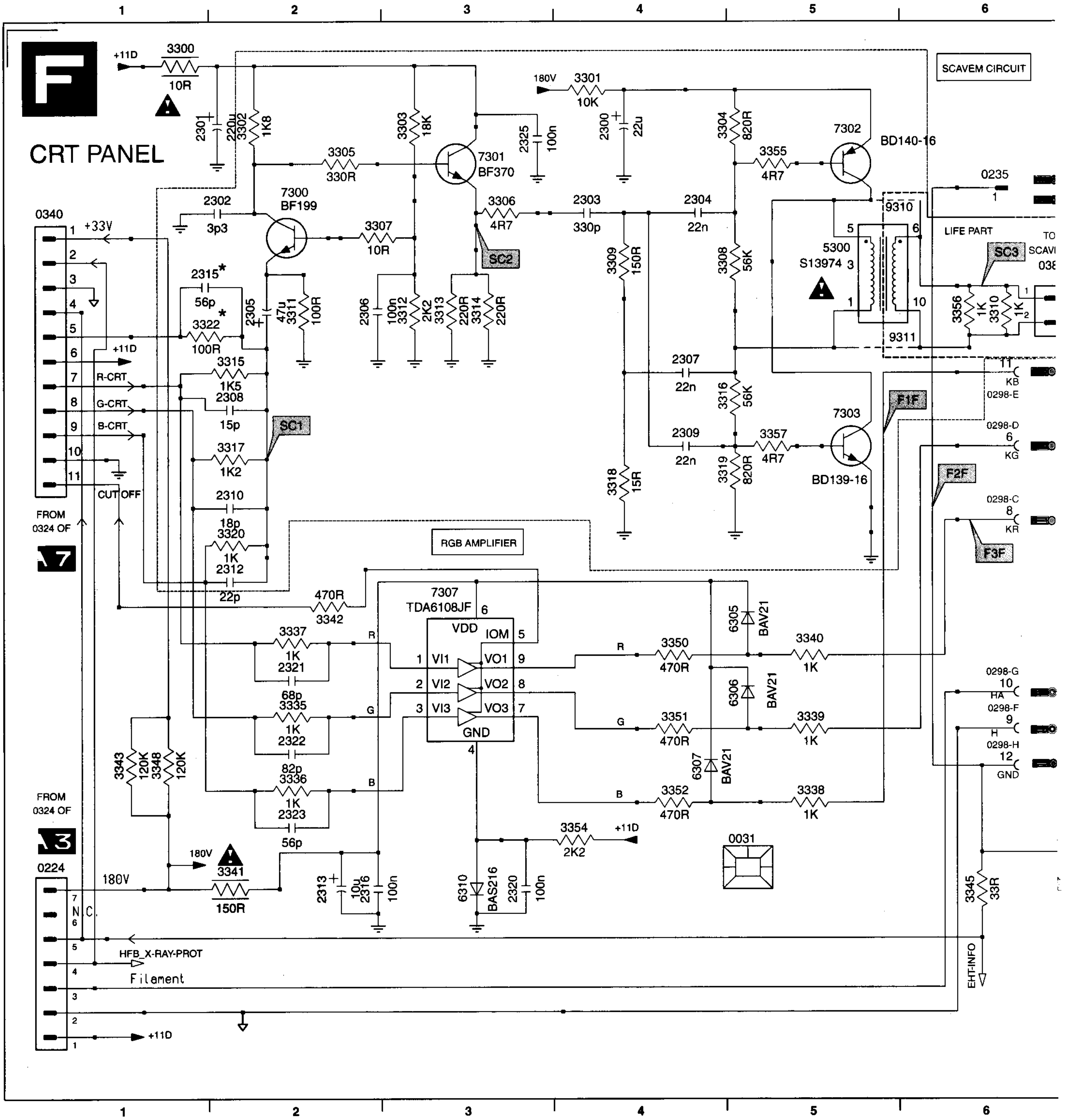
3315 B2
3316 C5
3317 C2
3318 C4
3319 C5
3320 C2
3322 B1
3334 E7
3335 D2

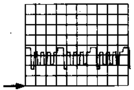
3336 E2
3337 D2
3338 E5
3339 D5
3340 D5
3341 E2
3342 D2
3343 E1
3345 E6

3347 F9
3348 E1
3349 E8
3350 D4
3351 D4
3352 E4
3354 E4
3355 A5
3356 B6

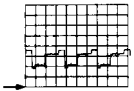
3357 C5
5300 B5
6305 D5
6306 D5
6307 E4
6310 E3
7300 A2
7301 A3
7302 A5

7303 C5
7307 D3
9310 A5
9311 B6

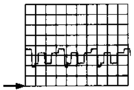

1
2
3
4
5
6
F
CRT PANEL
+11D
3300
10R
2301
220u
3302
1K8
3303
18K
7301
BF370
2325
100n
180V
3301
10K
2300
22u
3304
820R
7302
BD140-16
3305
330R
3355
4R7
SCAVEM CIRCUIT
0235
0340
+33V
2302
3p3
7300
BF199
3307
10R
3306
4R7
2303
330p
2304
22n
9310
5300
S13974
LIFE PART
TO SCAVEM
SC3
SC2
2315*
56p
3322
100R
2305
47u
3311
100R
2306
100n
3312
2K2
3313
220R
3314
220R
3309
150R
3308
56K
3356
1K
3310
1K
9311
+11D
R-CRT
G-CRT
B-CRT
CUT OFF
3315
1K5
2308
15p
SC1
3317
1K2
2310
18p
3320
1K
2312
22p
2307
22n
3316
56K
7303
F1F
2309
22n
3357
4R7
3319
820R
3318
15R
BD139-16
F2F
F3F
0298-E
KB
0298-D
KG
0298-C
KR
FROM 0324 OF
RGB AMPLIFIER
470R
3342
7307
TDA6108JF
VDD
IOM
VI1
VI2
VI3
VO1
VO2
VO3
GND
6305
BAV21
6306
BAV21
6307
BAV21
3337
1K
2321
68p
3335
1K
2322
82p
3336
1K
2323
56p
3350
470R
3340
1K
3351
470R
3339
1K
3352
470R
3338
1K
0298-G
HA
0298-F
H
0298-H
GND
3343
120K
3348
120K
3354
2K2
0031
0224
180V
3341
150R
2313
10u
2316
100n
6310
BAS216
2320
100n
3345
33R
EHT-INFO
N.C.
HFB_X-RAY-PROT
Filament


F1F Blue

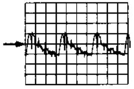
50V / div DC
10ms / div


F2F Green

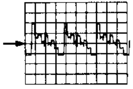
50V / div DC
10ms / div


F3F Red

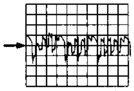
50V / div DC
10ms / div


SC1 7300_E

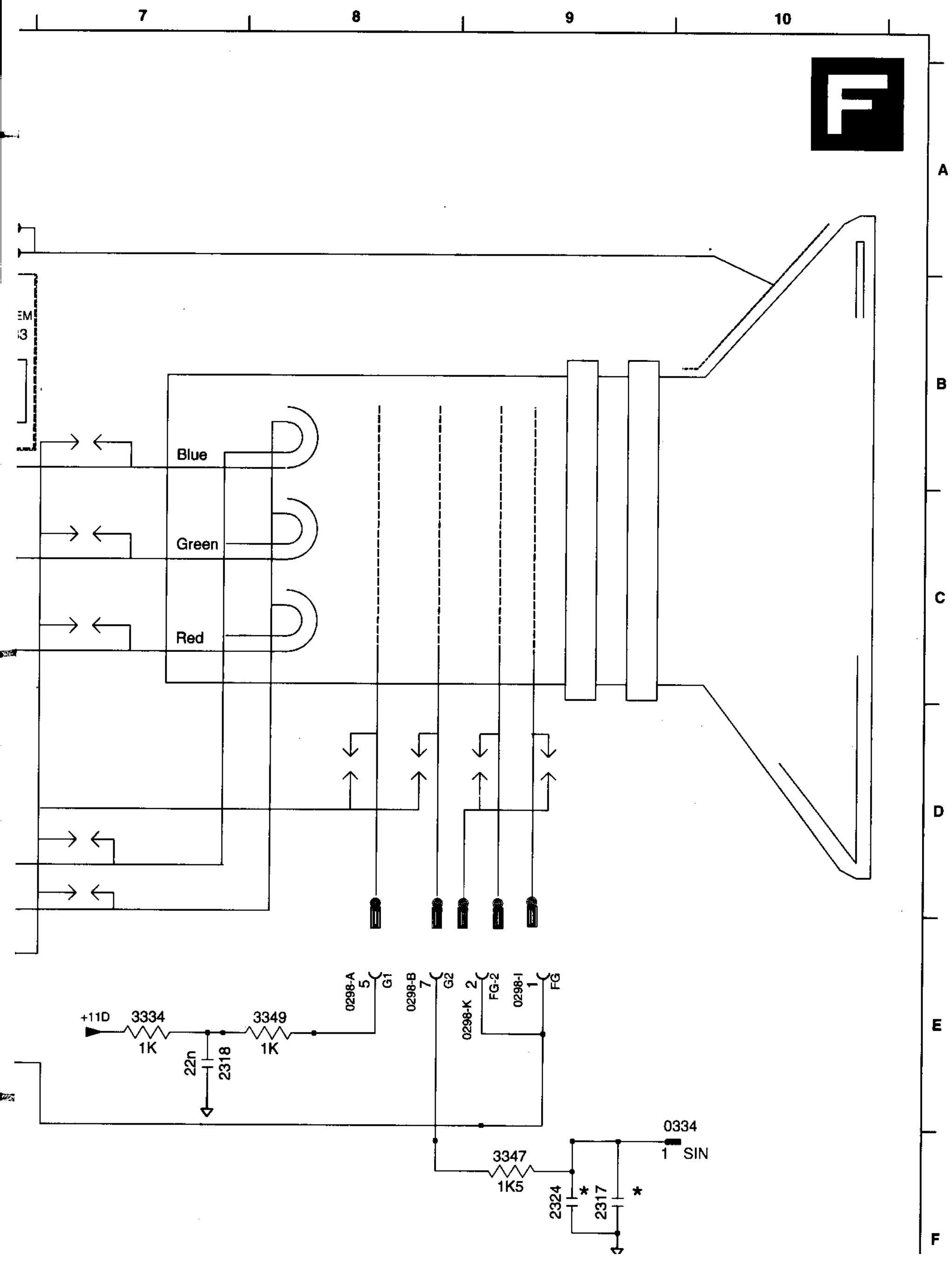
20mV / div AC
10ms / div


SC2 7301_E

1V / div AC
10ms / div


SC3 Coil

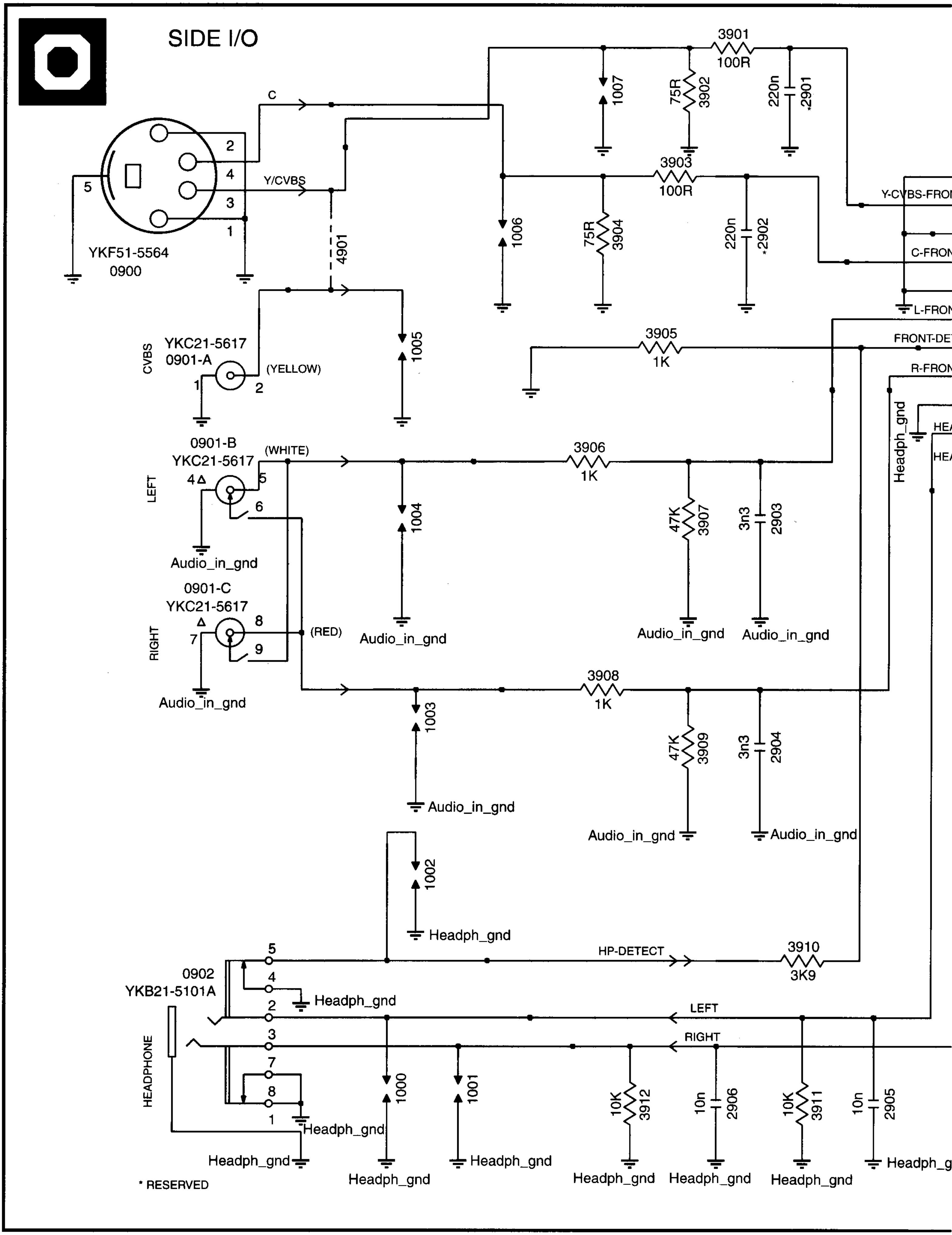
0,5V / div AC
10ms / div

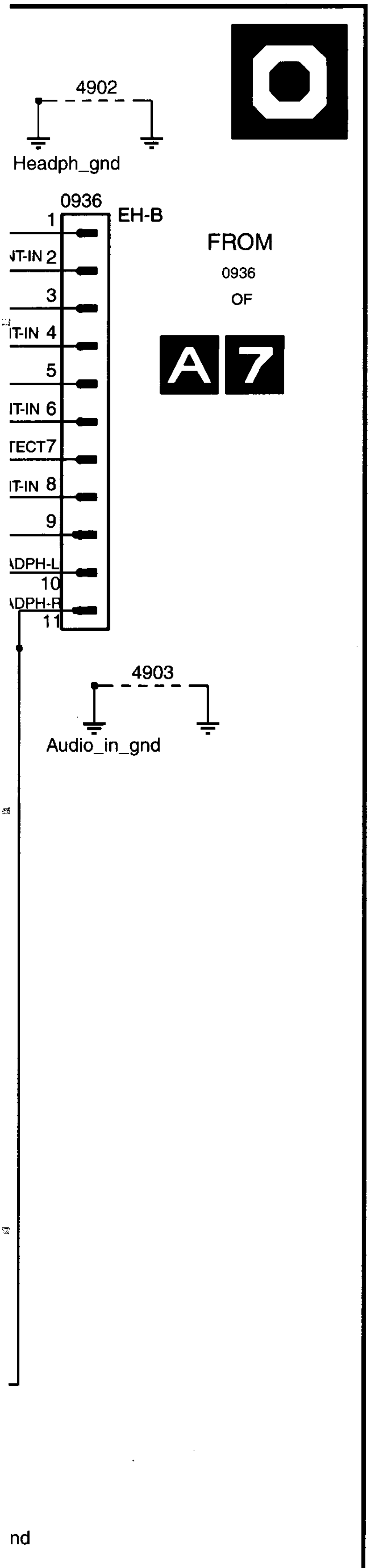

7
8
9
10
F
A
B
C
D
E
F
EM
3
Blue
Green
Red
+11D
3334
1K
22n
2318
3349
1K
0298-A
5
G1
0298-B
7
G2
0298-K
2
FG-2
0298-I
1
FG
3347
1K5
2324
*
2317
*
0334
1
SIN

Diversity CRT-Panel

PosNr	*29"*	*25"*	*28"*	*28" WS*	*32" WS*
0298	-	-	-	-	SOC 9P
0298	CON 8P	CON 8P	CON 8P	CON 8P	-
0383	CON 02P	-	-	CON 02P	CON 02P
2300	22U	-	-	22U	22U
2301	220U	-	-	220U	220U
2302	3P3	-	-	3P3	3P3
2303	470P	-	-	470P	470P
2304	22N	-	-	22N	22N
2305	47U	-	-	47U	47U
2306	100N	-	-	100N	100N
2307	22N	-	-	22N	22N
2308	15P	-	-	15P	15P
2309	22N	-	-	22N	22N
2310	18P	-	-	18P	18P
2312	22P	-	-	22P	22P
2317	4N7	4N7	4N7	4N7	-
2317	4N7	4N7	4N7	4N7	-
2321	-	68P	68P	-	-
2322	-	82P	82P	-	-
2323	-	56P	56P	-	-
2324	-	-	-	-	820P
2325	100N	-	-	100N	100N
3300	FUSE 10R	-	-	FUSE 10R	FUSE 10R
3301	3W 10K	-	-	3W 10K	3W 10K
3302	1K8	-	-	1K8	1K8
3303	18K	-	-	18K	18K
3304	820R	-	-	820R	820R
3305	330R	-	-	330R	330R
3306	4R7	-	-	4R7	4R7
3307	10R	-	-	10R	10R
3308	56K	-	-	56K	56K
3309	150R	-	-	150R	150R
3310	1K	-	-	1K	1K
3311	100R	-	-	100R	100R
3312	2K2	-	-	2K2	2K2
3313	220R	-	-	220R	220R
3314	220R	-	-	220R	220R
3315	1K5	-	-	1K5	1K5
3316	56K	-	-	56K	56K
3317	1K2	-	-	1K2	1K2
3318	15R	-	-	15R	15R
3319	820R	-	-	820R	820R
3320	1K	-	-	1K	1K
3335	100R	-	-	100R	100R
3335	-	1K	1K	-	-
3336	100R	-	-	100R	100R
3336	-	1K	1K	-	-
3337	100R	-	-	100R	100R
3337	-	1K	1K	-	-
3355	4R7	-	-	4R7	4R7
3356	1K	-	-	1K	1K
3357	4R7	-	-	4R7	4R7
5300	TFM	-	-	TFM	TFM
7300	SIGF199	-	-	SIGF199	SIGF199
7301	SIGF370	-	-	SIGF370	SIGF370
7302	TRA POW	-	-	TRA POW	TRA POW
7303	TRA POW	-	-	TRA POW	TRA POW
9305	WR	-	-	WR	WR
9308	WR	-	-	WR	WR
9309	WR	-	-	WR	WR
9312	WR	-	-	WR	WR
9313	WR	-	-	WR	WR
9424	-	-	-	-	WR

Side I/O


SIDE I/O
C
Y/CVBS
2
4
3
1
5
YKF51-5564
0900
4901
3901
100R
1007
75R
3902
220n
2901
*
3903
100R
1006
75R
3904
220n
2902
*
Y-CVBS-FRO
C-FRON
L-FRON
FRONT-DE
R-FRON
3905
1K
1005
CVBS
YKC21-5617
0901-A
(YELLOW)
1
2
0901-B
YKC21-5617
(WHITE)
LEFT
4
5
6
Audio_in_gnd
3906
1K
1004
47K
3907
3n3
2903
Audio_in_gnd
Audio_in_gnd
Audio_in_gnd
0901-C
YKC21-5617
RIGHT
7
8
9
(RED)
Audio_in_gnd
3908
1K
1003
47K
3909
3n3
2904
Audio_in_gnd
Audio_in_gnd
Audio_in_gnd
Headph_gnd
HEA
HEA
1002
Headph_gnd
0902
YKB21-5101A
HEADPHONE
5
4
2
3
7
8
1
HP-DETECT
3910
3K9
Headph_gnd
LEFT
RIGHT
1000
1001
10K
3912
10n
2906
10K
3911
10n
2905
Headph_gnd
Headph_gnd
Headph_gnd
Headph_gnd
Headph_gnd
Headph_gnd
Headph_gnd
Headph_gnd
Headph_g
* RESERVED


4902
Headph_gnd
0936
EH-B
1
NT-IN 2
3
IT-IN 4
5
IT-IN 6
TECT7
IT-IN 8
9
DPH-L
10
DPH-R
11
4903
Audio_in_gnd
FROM
0936
OF
A7
nd

CL96532156_070.eps
110200

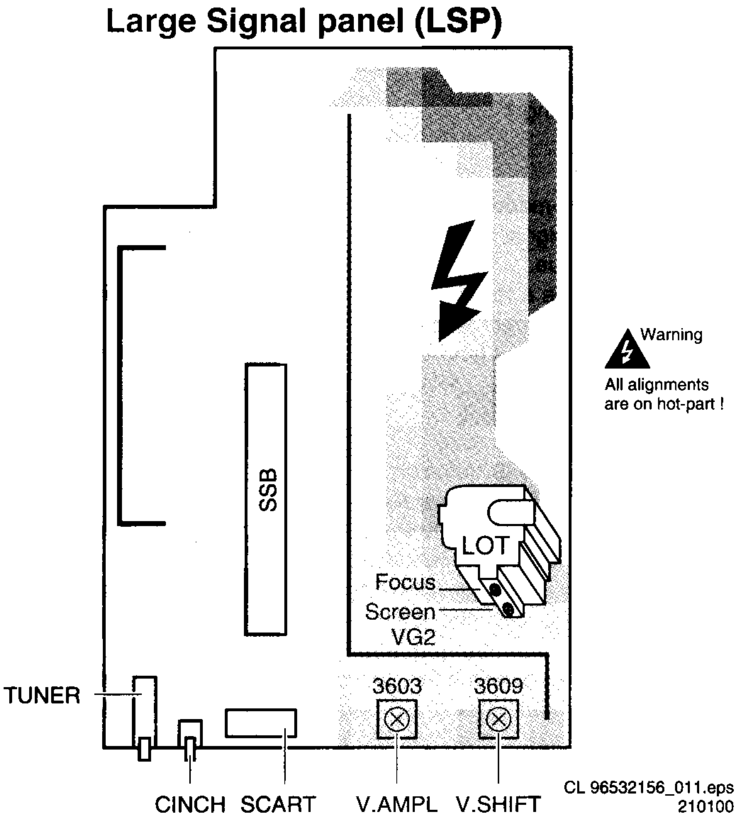
8. Electrical alignments

8.1 General alignment conditions

All electrical alignments should be made under the following conditions:

- Power supply voltage: 230 V ± 10 %; 50 - 60 Hz ± 5 %. Should be applied via an isolating transformer with low internal resistance.
- Warm-up time ≈ 20 minutes.
- Voltages and oscillograms are measured in relation to Tuner earth (with exception to the voltages on the primary side of the power supply). Never use the cooling fins/plates as ground: they are 'hot' ! ! !
- Test probe: Ri > 10 MΩ, Ci < 20 pF.
- Use an isolated trimmer/screwdriver for the alignments

8.2 Alignments on the large signal panel (LSP)



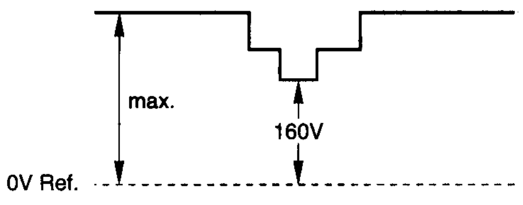
CL 96532156_011.eps
210100

Figure 8-1

8.2.1 Focusing

1. Tune the set to a crosshatch test pattern (use an external video pattern generator).
2. Adjust the Focus potentiometer (upper potmeter, see figure 8-1) for an overall optimum focusing of the picture.

8.2.2 Vg2 adjustment



86532031_007.AI
210100

Figure 8-2

Elucidation: In the frame blanking period of the R, G and B signals applied to the CRT, a measuring pulse with different DC levels is inserted by the 'HOP' video processor. Measure the black level pulse during the vertical flyback at the RGB cathodes of the CRT.

1. Put the set in the SDM mode (see chapter 5.2.1).
2. Insert a black test-pattern signal (carrier 475.25 MHz) to the Tuner input.
3. Connect an oscilloscope (position 50 V/Div DC and 2 ms/ Div) alternately to the CRT cathodes (Red pin 8, Green pin 6, Blue pin 11) and measure for each cathode the DC level of the measuring pulse (see elucidation above and figure 8-2) and write down each value. Remark: Trigger the scope external via a CVBS signal (for instance via pin 19 of the SCART1 connection).
4. Adjust the Vg2 potentiometer (lower potmeter, see figure 8-1) so that the measuring pulse with the highest noted level is on 160 ± 3 V_{DC} level.

8.3 Vertical amplitude alignment

1. Tune the set to a crosshatch test pattern (use an external video pattern generator).
2. Align the vertical amplitude with R3603 (see Fig. 8-1) so that the complete test pattern is visible.

8.4 Vertical shift alignment

1. Tune the set to a crosshatch test pattern (use an external video pattern generator).
2. Align the vertical centering with R3609 (see Fig. 8-1) so that the test pattern is located vertically in the middle.
3. Repeat the 'vertical amplitude' alignment if necessary.

8.5 Alignments and settings in the Service Alignment Menu

8.5.1 General

Put the set in the SAM mode (see chapter 5.2.2). The Service Alignment Mode menu will now appear on the screen. Via 'Alignments' the following submenu's can be selected:

- General:
  - Drive
  - Luminance Delays
  - EHT Compensation
  - Soft clipper
  - Luma gain
  - IF AFC
  - Tuner AGC
  - Blend intensity
  - Adjust Peak White Limiter
  - Vg2 Test Pattern
- Normal Geometry: General geometry alignments.
- Super Wide Geometry: Geometry alignments for the 'Panorama' position in 16:9 sets (only valid for wide screen sets; alignments can be performed, however, it is better to set values as mentioned below).
- Options: Setting the initialisation codes in the set via text.
- Option Numbers: All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.
- Store: Store all alignments.

The alignments are explained now in the sequence of the sub-menu:

8.5.2 'General' alignments in Service Alignment Menu:

- Once all alignments/settings have been completed the item 'Store' must be selected to record all the values in the permanent memory of the set.
- If the Option codes have been changed and stored, the set has to be switched 'OFF' and 'ON' using the mains switch to activate the new settings (when switching via Standby, the option code settings are NOT read by the microprocessor).
- If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default values.
- A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'Test pattern on/off'. The test pattern only appears AFTER the specific alignment has been selected. The test patterns are generated by the Teletext-IC (OTC).

'Drive'

- Method 1 (with colour analyser):
  1. If you want to align tint-settings with a colour-analyser, the Test pattern must be switched on. You get a white block in middle of the image now.
  2. Before doing the Tint-settings the 'Cathode'-parameter must be aligned. This is dependent of the picture tube size and brand. See table “Cathode parameter” for the colour-analyser readings.
  3. Tint-settings: Set the white levels for the 3 Tint-settings 'Normal', 'Warm' and 'Cool'. The next values must be aligned (see table “White levels”).

Cathode parameter	
CRT	Light output (cd/m^2)
25" FS	50,0
28" FS	35,0
29" SF	40,0
28" WS	45,0
32" WS	40,0

White levels			
	Cool	Normal	Warm
X	280	289	303
Y	287	299	314
Temp. (K)	10200	8700	7200

- Method 2 (without colour analyser):
  1. Without having a colour-analyser one can set some parameters. This is the next best solution. The setting-parameters are average values coming from production (statistics).
  2. Before doing the Tint-settings the 'Cathode'-parameter must be set. For all picture tubes the value '5' must be entered.
  3. The 'Tint' setting must be on 'normal'.
  4. Tint-settings: Set the Red, Green and Blue parameters for the 3 Tint-settings 'Normal', 'Warm' and 'Cool'. See table 8.4 for the values.
  5. Red BL offset: herewith the Black Level can be aligned very precise. Pre-set value is 7.
  6. Green BL offset: herewith the Black Level can be aligned very precise. Pre-set value is 7.

Tint settings			
	Cool	Normal	Warm
R	24	25	27
G	20	20	20
B	18	14	10

'Luminance delays'

With the 'Luminance delays' alignment the luminance information is placed on the chrominance information (brightness is pushed onto the colour). Use a colour bar/grey scale pattern as test signal.

- Lum. Delay Pal: Apply a PAL colour bar/grey scale pattern as a test signal. Adjust ‘Lum. Delay Pal’ until the transients of the colour part and black and white part of the test pattern are at the same position.
- Lum. Delay Secam: Apply a SECAM colour bar/grey scale pattern as a test signal. Adjust ‘Lum. Delay Pal’ until the transients of the colour part and black and white part of the test pattern are at the same position.
- Lum. Delay Bypass: apply a NTSC colour bar/greyscale pattern as a test signal. Adjust value until the transients of the colour and black & white part of the test area are at the same position.

‘EHT compensation’

Fixed setting: 0

‘Soft clipper”

Fixed setting:Pwl + 0%

‘Luma gain’

Fixed setting:1

‘IF AFC’

The SAM-mode is needed to make alignment, a test generator to make signal and the Installation-menu to check the 'Fine Tune' value.

Supply, via a video generator (e.g. PM5518), a TV-signal with a signal-strength of at least 1 mV and a frequency of 475.25 MHz. Use BG if possible, otherwise match the system of your generator with the received signal in the set.

Alignment procedure:

1. Go to the 'Installation' menu.
2. Select 'Manual installation'.
3. Tune the TV-set to the system and frequency described above via 'Search' - '475' - 'OK'.
4. If the frequency showed in the line 'Fine tune' is between 475.18 MHz and 475.31 MHz, you don't need to re-adjust the IF-AFC.
5. If not, adjust the frequency in the 'Fine tune' line to 475.25 MHz and 'Store' the program (this is very important because this will disable the AFC algorythm).
6. Now go to the SAM and select 'Alignments' - 'General' - 'IF AFC'.
7. During the 'IF AFC'-parameter adjustment, one can see OSD feedback in the top of the screen. The OSD feedback can give 4 kind of messages:

AFC-window	AFC-frequency versus reference
Out	High
In	High
In	Low
Out	Low

The first item (In or Out) informs you whether you are in or out the AFC-window.

The second item (High or Low) informs you about whether the AFC-frequency is too high or too low.

1. First you must align the 'IF AFC'-parameter such that you come into the AFC-window (= 'In')
2. Then you must look for the point where the 'IF AFC'-parameter changes from High to Low. This level is the value you are looking for.
3. After adjustment 'Store' the value.
4. Now return to the 'Installation' menu.
5. Select 'Manual Installation' - 'Search' - '475' - 'OK' and 'Store'. This will set the AFC 'on' again.

Service-tip: If you do not trust the accuracy of the frequency of your Service-generator, first 'measure' with 'Fine tune'-line (manual install-menu) of a good set your video generator.

'Tuner AGC'

The SAM-mode is needed to make alignment, a test generator to make signal, a DC-Voltmeter to measure at pin 1 of Tuner.

Supply a TV-signal, with a frequency of 475.25 MHz and a signal-strength of about 2 mV. Measure the DC-voltage on pin 1 of the Tuner (position 1200). With the 'Tuner AGC'-alignment in the SAM-menu, this voltage can be aligned. Alignment is correct when DC-voltage is just below 3.5 V.

'Blend intensity'

(This alignment could be used when micro controller or HOP-IC has been replaced).

It aligns the level of transparency of the menu-picture blended into the main-picture.

1. Position the brightness-, contrast- and colour setting in the middle position (picture-menu).
2. Apply a signal with a 100 % white video-pattern.
3. Connect an oscilloscope to pin 7 of connector 0340 of the CRT panel and measure the Red output level.
4. Align 'blending intensity'-parameter such that the blended signal is 65 % of the black-white amplitude. Practically this will be about 1.3 V (blended signal) versus 2 V (full white signal).
5. The parameter can be adjusted in between 0 and 31.

'Adjust Peak White Limiter'

Depending on the picture-tube size, the next value of the table must be entered:

Peak White Limiter	
25" FS	4
28" FS	4
29" SF	4
24" WS	4
28" WS	4
32" WS	4

'Vg2 Test Pattern'

Here the Vg2 Test pattern can be switched on.

8.5.3 'Normal Geometry' alignments in the Service Alignment Menu

Warning: At this moment, the 'INTERNAL TEST PATTERN' of the set software will lead to a mis-alignment of the picture geometry. Therefor use an external generator with a geometry pattern (e.g. crosshatch) to align the set (only for the 'Vertical slope' adjustment the internal test pattern can be used).

'Vertical slope'

Select 'Test Pattern on' (read warning above).

1. Set the start conditions for 16:9 sets: ~~'V. S-correction' value on 8 for the 28" and on 7 for the 32" set.~~ The boundary-stripes of the test pattern should be positioned on the edge of the picture tube.
2. Align 'V. slope' (when aligning the below half of the picture is blanked). The middle line of the test pattern must be matched with the edge of this blanking/picture transient in the middle of the picture. Pushing 'MENU' button again, gives you previous menu again. (This alignment is meant to align the zero crossing of the frame-deflection to the mechanical middle of the picture tube.)

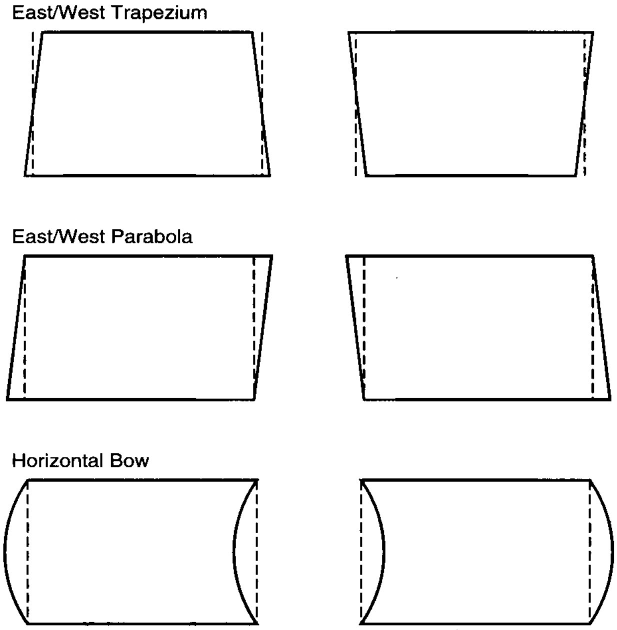
'Horizontal amplitude and centring'

Use an external pattern generator with a geometry pattern (e.g. crosshatch).

1. Using 'H. amplitude' align the horizontal amplitude so that the entire test pattern is visible.
2. Use an external test signal, with a centre-reference from a service-generator. Use 'H shift' to align the picture horizontally in the middle.
3. Repeat the 'H amplitude' alignment if necessary.

'East/west alignment'

Use an external pattern generator with a geometry pattern (e.g. crosshatch).



CL 96532156_012.eps
250100

Figure 8-3

1. Use 'East/West Parabola' to align the vertical lines until straight.
2. 'Upper East/West corner' to align the vertical lines in the upper corners until straight.
3. 'Lower East/West corner' to align the vertical lines in the lower corners until straight.
4. Use 'East/West Trapezium' to align for a rectangular.
5. Use 'Horizontal Parallelogram' to align for straight vertical lines if necessary.
6. Horizontal Bow' (neutral value 31. With this alignment the E/W parabola can be corrected such that it becomes symmetrical).

Repeat steps 1 to 6 if necessary.

8.5.4 'Super wide geometry' alignments (for widescreen sets) in the Service Alignment Menu

The header of this paragraph and also the menu's are somewhat misleading. We only need to set the following values (if the normal geometry alignment has been performed correctly):

1. ~~V. S-Correction: enter value of 'normal geometry' alignment.~~
2. H. amplitude: enter value of 'normal geometry' alignment subtracted by 4.
3. East/west Parabola: enter value of 'normal geometry' alignment.

8.6 Option menu

8.6.1 Introduction:

The microprocessor communicates with a large number of I^{2}C-IC's in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which IC's have to be addressed. The presence of specific IC's or functions is made known by means of the option codes.

All options codes can be manipulated using both the option numbers and/or the Option menu.
All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'. All software related options that are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode", can also be reached directly via the 'DEALER' button of the DST.

8.6.2 Options in the Service Alignment Mode

Menu-item	Subjects	Options	Physically in the set
Dual screen/PIP	Aux type	Yes	Dual Screen / PIP module present
		No	Dual Screen / PIP module not present
Teletext/EPG	TXT	Yes	Teletext present
		No	Teletext not present
	NextView present	Yes	NextView set
		No	NextView not set
	NextView type	Flashram	Flash-RAM present
		No Flashram	Flash-RAM present
Communication	Easylink Plus	Yes	Easylink Plus set
		No	Easylink Plus not set
Picture Tube	CRT Type	4:3	4:3 picture tube
		16:9	16:9 picture tube
	Picture Rotation	Yes	Frame rotation circuitry present (diagram **A4**)
		No	Frame rotation circuitry not present
	Dynamic focus	Yes	Dynamic focus picture tube present
		No	Dynamic focus picture tube not present
	Dooming prevent	Off	
		4:3	
		SF 16:9	
		RF 16:9	
Video repro	Featurebox type	Eco	PROZONIC not present
		Prozonic	PROZONIC present
	Field memories	2	
		3	
	Lightsensor	Yes	Lightsensor present
		No	Lightsensor not present
	PALplus	Yes	PALplus module present
		No	PALplus module not present
	Combfilter	Yes	Not valid for Europe
		No	
	Picture improvement	Yes	
		No	
	Picnic	Yes	PICNIC present
		No	PICNIC not present
	Picnic AGC	Yes	In normal operation: Yes
		No	During 'Drive' alignments: No
	Signalling bits	Yes	
		No	
Source Selection	External 3	Yes	3rd EURO connector present
		No	No 3rd EURO connector present
	External 4	Yes	4th EURO connector present
		No	No 4th EURO connector present
Audio Repro	Dolby	None	
		Pro Logic	
	Rear speakers	Corded	Passive surroundbox present
		Virtual	
		Cordless	Active surroundbox present
	Acoustic system	FL7	Applicable for sets with subwoofer
		FL8	Applicable for sets without subwoofer
		FL9 Monitor	Monitor look (only tweeters at both sides)
		FL9 DAS	FL9 with full range speakers at both sides
	MSP type	MSP3411	
		MSP3415	
		MSP3451	
	AVL enable	On	
		Off	
Miscellaneous	Heatsink Present	Yes	Heatsink present on CRT/SCAVEM panel (diagram F)
		No	Heatsink not present on CRT/SCAVEM panel (diagram **F**)
	Tuner type	UV1316	
		TEDE9	

CL96532156_038.eps
210100

8.6.3 Dealer Options in the Service Alignment Mode

- After the option(s) have been changed, they must be stored via the 'STORE' command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the EAROM is then read out again).

8.6.4 Option number

In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

Example: Option number 28PT7306/12 could be:
04929 04418 04417 00016
08199 00001 00000 00000

The first line indicates the hardware options 1 to 4, second line is reserved for the software options.
Every 5-digit number represents 16 bits (so maximum number can be 65536 if all options are set).

Bit	HW1	HW2	HW3	HW4	SW1	SW2	SW3	SW4
0 (1)	FBX (1)		EXT3	MSP (8)	Auto TV	CTI		
1 (2)	FBX (1)	Dolby PL	EXT4	MSP (8)	Auto Store mode (10)			
2 (4)	FBX (1)	Virtual rear spkrs		China IF	Auto Store mode (10)			
3 (8)	Combfilter	Cordless rear spkrs		Tuner (9)				
4 (16)	PAL-Plus	Dolby Digital	Dual Screen (6)	TXT	Picture mute			SLDP (13)
5 (32)	Field mem. (2)		Dual Screen (6)	China TXT	Demo			SLDP (13)
6 (64)	Light sensor	Cabinet (4)	TXT-EPG-DS		Virgin			AVL
7 (128)	LTP	Cabinet (4)	Aux-headphone					
8 (256)	PICNIC	P50	Aspect Ratio (7)					
9 (512)	PICNIC-AGC		Tilt					
10 (1024)			DAF					
11 (2048)	LNA (3)							
12 (4096)	WSS	EPG	Heatsink		TXT pref. (11)			
13 (8192)	Time constant	EPG type (5)	Home Cinema		TXT region (12)			
14 (16384)								
15 (32768)								

CL96532156_039.eps
210100

All bits can be set 'On' (= 1) when the option is available or 'Off' (= 0) when it is not, except for:
(1) 0 = Eco, 1 = PROZONIC, 4 = Eco-DNR.
(2) 0 = 2 Field memories, 32 = 3 Field memories.
(3) 0 = Normal, 8192 = Fast.
(4) 0 = FL7, 64 = FL8, 128 = FL9.
(5) 0 = Type 2, 8192 = Type 2C3.
(6) 0 = None, 16 = PIP, 32 = Dual Screen.
(7) 0 = 4:3, 256 = 16:9.
(8) 0 = MSP3415, 1 = MSP3451, 2 = MSP3411.
(9) 0 = Philips, 8 = Alps.
(10) 0 = None, 2 = PDC/VPS, 4 = TXT-Page, 6 = PDC/VPS/TXT-Page.
(11) 0 = TOP, 4096 = FLOF.
(12) 0 = East, 8192 = West.
(13) 0 = Off, 16 = 4:3, 32 = SF16:9, 48 = RF16:9.
When all the correct options are set, the sum of the decimal value (between brackets in 1st column) of each column will give the option number.

9. Circuit descriptions and abbreviation list

9.1 Circuit descriptions

The following circuits are described:

1. Introduction
2. Block diagrams
3. Power supply
4. Control
5. Tuner & IF
6. Video: High-end Input Processor
7. Video: Feature box
8. Video: High-end Output Processor
9. Synchronisation
10. Horizontal deflection
11. Vertical deflection
12. Audio
13. Teletext / NexTView
14. CRT / SCAVEM / Rotation
15. Software related features

9.1.1 Introduction

The EM2E Europe is a lower specified MG-chassis. EM stands for Eco-MG, 2 for the used processor (1 = Painter, 2 = OTC) and E stands for Europe. This will be, at the moment of launch, the cheapest realised 100 Hz set.

The architecture consist of a conventional large signal panel (LSP) and a small signal board (SSB) module, placed into a so called SIMM-connector (Standard Interface, 80 pins).

The LSP is built up very conventional, with hardly any surface mounted components on the copper side. Difference with the MG-chassis is that the EM2E LSP has a very large 'hot' part, including the deflection coil.

The SSB is a high tech module (2 sides reflow technology, full SMC) with very high component density and complete shielding for EMC-reasons. Despite this, it is designed in such a way, that repair on component level will be possible. To achieve this, attention has been paid to:

- The position of service test lands (Tuner side).
- Accessibility (Tuner side).
- Clearance around surface mounted IC's (for replacing).
- Diagnostics & Fault Finding via ComPair.

Due to the low amount of cabling etc., expectation is that the FCR will be low.

Attention: During the first 4 to 6 months of production, the EM2E set-software will be integrated into a flash-RAM on the SSB. After that period, a mask-ROM will be used. Which IC is used is not of interest for service, but for both solutions it means that Service Workshops must be equipped with dedicated (de)solder equipment for exchanging these IC's.
In case flash-RAM or mask-ROM has to be replaced in the field, dealer will receive always an up-to-date flash-RAM.

Warning: Be aware that half of the LSP-circuitry is 'hot', including the deflection coil.

Protection: The start-up behaviour of the EM2E is different then that of the MG-chassis, meaning that there does not exist a situation as in the MG where we have 'supply ON / deflection circuit OFF'.
This means that isolating failures in the EM2E must be done in a different way. See Chapter 5 of this manual.

9.1.2 Block diagrams

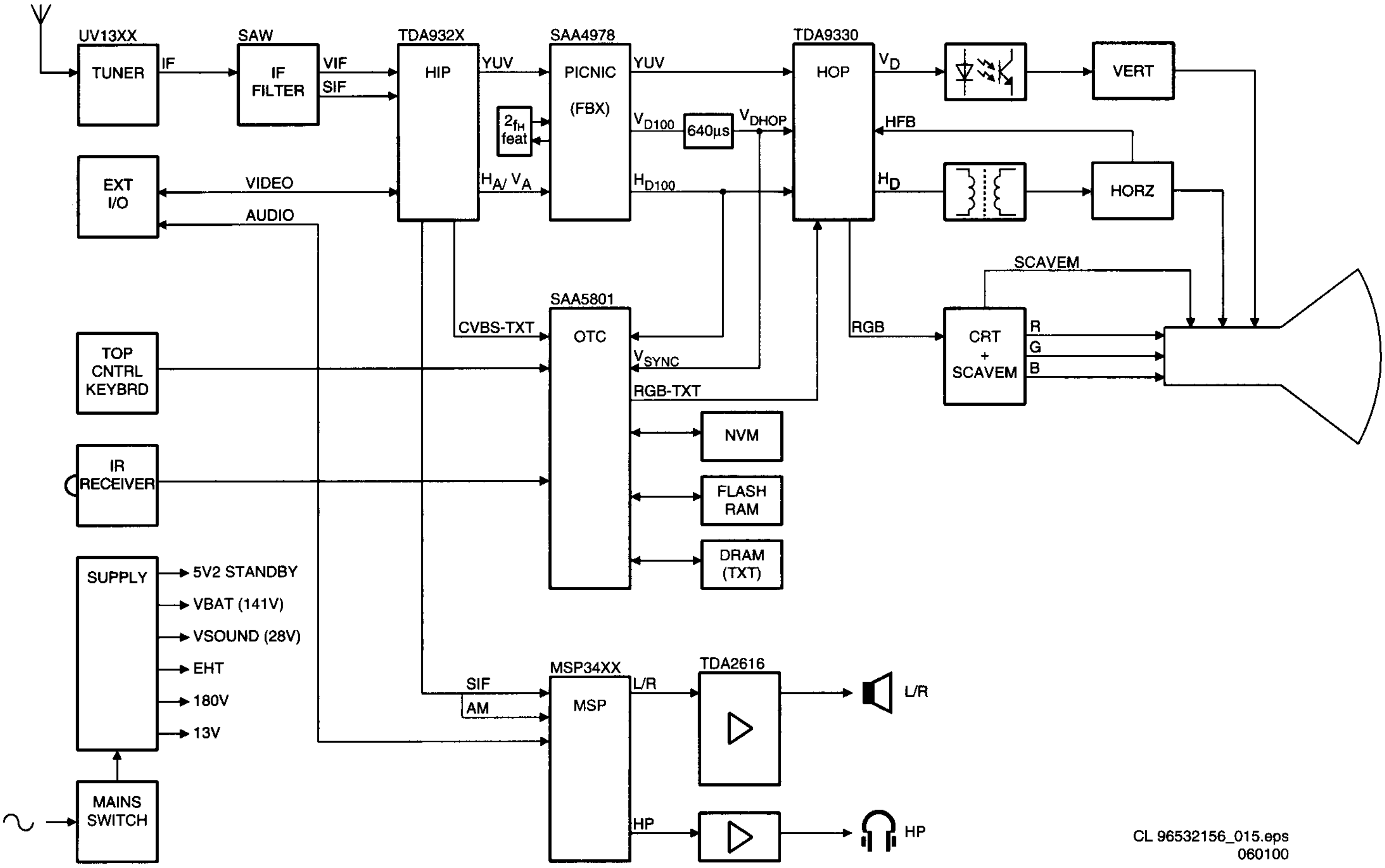

UV13XX
TUNER
IF
SAW
IF FILTER
VIF
SIF
TDA932X
HIP
YUV
2fH feat
HA/ VA
SAA4978
PICNIC
(FBX)
YUV
VD100
640µs
VDHOP
HD100
TDA9330
HOP
VD
HFB
HD
VERT
HORZ
SCAVEM
RGB
CRT + SCAVEM
R
G
B
EXT I/O
VIDEO
AUDIO
CVBS-TXT
SAA5801
OTC
VSYNC
RGB-TXT
TOP CNTRL KEYBRD
IR RECEIVER
NVM
FLASH RAM
DRAM (TXT)
SUPPLY
5V2 STANDBY
VBAT (141V)
VSOUND (28V)
EHT
180V
13V
MAINS SWITCH
SIF
AM
MSP34XX
MSP
L/R
HP
TDA2616
L/R
HP
CL 96532156_015.eps
060100

Figure 9-1

The tuner type UV1316 is a PLL tuner and delivers the IF-signal, via audio & video SAW-filters, to the HIP (High-end Input Processor). The HIP has the following functions:

- IF modulation.
- Video source- and record select.
- Colour decoder.
- Synchronisation.

Two SCART-connectors can be used: SCART1 is fully equipped and SCART2 is meant for VCR. Pin 10 of SCART2 is used for Easylink and there is a possibility for Y/C in. The CVBS-out on pin 19 can be used for WYSIWYR (What You See Is What You Record).

The HIP delivers the signal to the PICNIC. This IC takes care of:

- Analogue to Digital conversion and vice versa.
- 50 to 100 Hz conversion.
- Panorama mode.
- Noise reduction.
- Dynamic contrast.

For Digital Scan the PROZONIC is required, which can be connected to the PICNIC. This IC is mentioned as 2fH features in the blockdiagram.

After the PICNIC the, now 100 Hz, YUV- and H/V-signals are fed to the HOP (High-end Output Processor). This IC handles the video control and geometry part. The RGB-signals from TXT/OSD are also inserted via the HOP. The video part delivers the RGB signals to the CRT-panel and the geometry part delivers the H-drive, V-drive and also a drive-signal for rotation (as a variable DC-level on the V-drive signal).

Both deflection circuits are 'hot' and located on the LSP and are driven by the HOP. To make the galvanic separation, the line drive is driven via transformer 5410 and the framedrive via optocoupler 7610.The horizontal output stage generates some supply voltages, the EHT-, focus- and Vg2-voltages.

The RGB amplifiers on the CRT-panel are integrated in one IC and are supplied with 180 V from the LOT.
The SCAVEM circuit modulates transitions of the Luminance (Y) signal on the horizontal deflection current, giving a sharper picture.

The sound part is built around the MSP34xx (Multichannel Sound Processor) for IF sound detection, sound control and source selection. Dolby decoding is also done by the MSP. Amplification is done via an integrated power amplifier IC, the TDA2616.

The microprocessor, called OTC (OSD, Teletext and Control), takes care of the analogue TXT input- and output processing. The OTC, ROM and RAM are supplied with 3.3 V, which is derived from the +5VSTANDBY.
The NVM (Non Volatile Memory) is used to store the settings, the FLASH RAM contains the set software and the DRAM is used for storing the Teletext pages.

In EM2E there is a separate Standby Supply in order to reduce the Standby power consumption. During Standby, the Main Supply is switched off (via TS7529). A relay is used to switch the Degaussing circuit.

The Main Supply, a SMPS based on the 'down-converter' principle, generates the 141 V (V_{BAT}) and the 28 V for the audio part.
Difference with former MG-sets is that V_{BAT} is not mains isolated (is 'hot') and is alignment free.

9.1.3 Power supply (diagram A1 & A2)

General
The power supply has a number of main functions. These functions are dealt with in succession:

- Mains filter
- Degaussing picture tube
- Standby power supply
- Main supply

Mains filter (diagram A1)

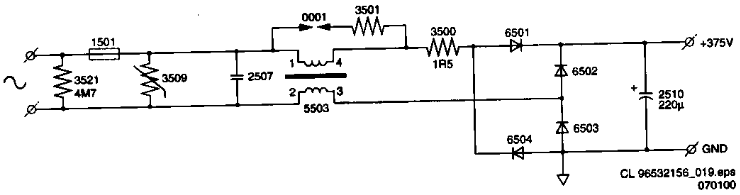


Figure 9-2

The mains filter has 2 functions: it prevents high-frequency signals to be transferred into the mains and it protects the set from lightning damage.

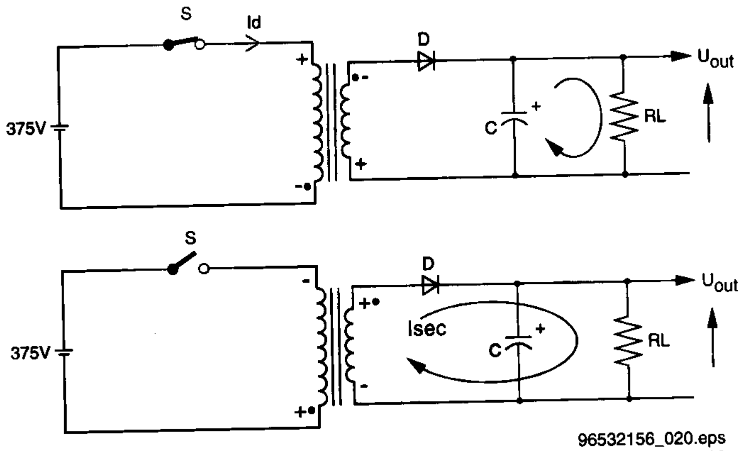
C2507 prevents the high-frequency signals, generated by the set, to be conveyed into the mains by short-circuiting them.

In case of a lightning surge between the 2 phases (differential mode) the energy is immediately bled away through the VDR (R3509) to the other phase.
In case of a lightning surge on both phases of the mains in relation to the aerial earth, the mains filter acts as a high resistance (U_{EMK}=L * dI/dt) as a result of which the voltage across coil L5503/04 increases. A spark gap (0001) prevents that the voltage increases too much, which would lead to a damaged coil. When ignited, the current will be discharged via this spark gap.
The two networks using R3503//0002 and R3502//0003 are also used for lightning protection. They lead the energy of a common-mode lightning surge from the 'cold' to the 'hot' side in case of insertion on the aerial or from the 'hot' to the 'cold' side in case of insertion via the mains-input.
Resistor R3500 is used for limiting the inrush-current.

For 240 V_{AC} mains-voltage applications, jumper 9502 is used. Diodes 6501 to 6504 now work as bridge rectifier charging C2510. For 110 V_{AC} mains-voltage applications, i.s.o. jumper 9502, jumpers 9503 and 9504 are used. Now the diodes will work as a voltage doubler charging C2516 and C2517 (not implemented for Europe).

Degaussing picture tube (diagram A1)
After switching 'ON' the set via the mains-switch, the DEGAUSS_INPUT signal from the processor (OTC) will be made high, transistor 7528 will conduct and relay 1002 will be activated. Initially a considerable current will flow, via PTC 3516, through the degaussing coil. The PTC will heat up, resistance will rise and the current will decay rapidly. The OTC will switch off the relay after 12 seconds.

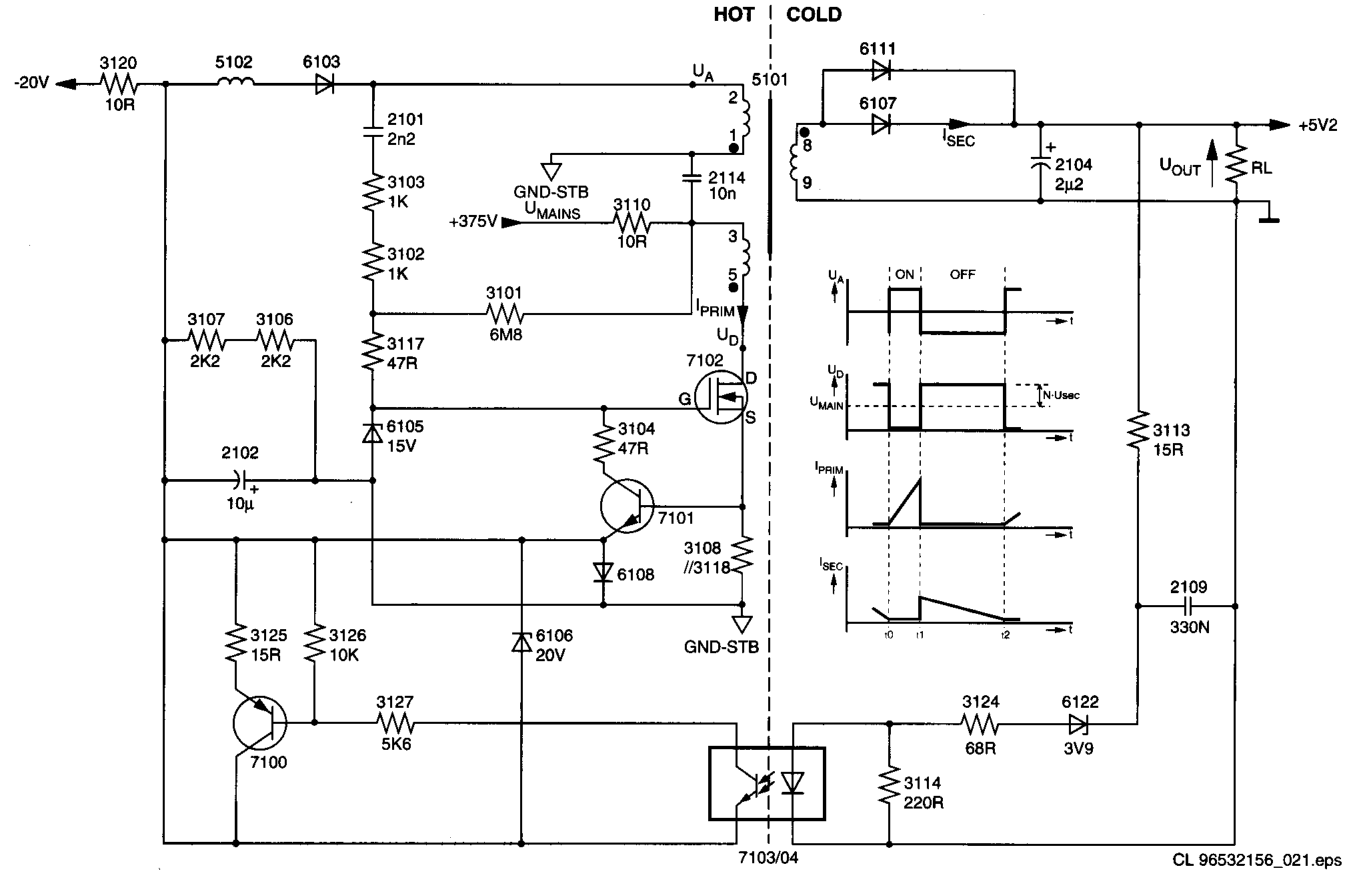
Standby power supply (diagram A2)
This power supply is of a SOPS type (Self-Oscillating Power Supply) and is regulated by the controlled switching of an oscillator. It uses the so-called 'Flyback' principle:



96532156_020.eps
210100

Figure 9-3

- After closing switch 'S', the current I_D will increase linear in time. The magnetic energy in the primary coil is directly proportional with the self-inductance of the coil and current I_D (thus with the time the switch is closed). The voltage polarity at the secondary winding is negative (due to different winding direction), meaning that diode D will block. Capacitor C will discharge via R_L, U_{OUT} will decrease.
- Opening switch 'S' will generate a counter-e.m.f. in the primary winding, trying to maintain current I_D. Through this the polarity of the secondary voltage will inverse. The magnetic energy, stored in the coil, will now be transformed to the secondary side. Diode D will now conduct, capacitor C will be charged and U_{OUT} will increase.



CL 96532156_021.eps
250100

Figure 9-4

To apply this on the EM2E (diagram A2): replace Switch 'S' by FET TS7102, coil L by L5101, diode D by D6107//D6111 and C by C2104.

Time interval t0 - t1:
After switching on the set, the gate of MOSFET TS7102 will be high (max. 15 V due to zenerdiode D6105). This will drive the FET into saturation ($U_{DS} = 0$ V). The DC-voltage U_{MAINS} will be transposed across the primary winding of L5101 (3, 5) resulting in a linear increasing current through this coil.
The voltage across the co-coupled coil (1, 2) is also positive and will keep the FET into conductivity via C2101, R3103, R3102 and R3117 for some time. The slope of the primary current is determined by the self-induction of the coil and on the magnitude of the supply voltage (+375 V).
The maximum current is determined by the time the FET stays into conductance (t0 - t1). This time is directly determined by the voltage across R3108//R3118. This voltage is a measure of the current and if it exceeds 1.4 V, TS7101 will be driven into conductivity and consequently connect the gate of TS7102 to earth; the FET will block. The current will be: 1.4 V / (15//4.7 ohm) = 0.39 A.
The voltage across the secondary winding (8,9) will be negative, diodes D6111 and D6107 will block.

Time interval t1 - t2:
The sudden current interruption in the primary coil, will induce a counter-e.m.f. that wants to maintain the current. The voltage on the drain of the FET will increase. The secondary voltage (8, 9) will become positive and will charge C2104 via D6107 and D6111. All energy that was stored in L5101 during t0 - t1 will be transferred into the load. Due to the transformer principle, a voltage will now be induced in the primary winding (3, 5) and the co-coupled winding (1, 2). This voltage will be: N * U_{SEC} (N = winding ratio).
The voltage across the co-coupled coil will be negative, keeping the FET blocked.

Time t2:
At t2, the current through the secondary coil will be reduced to zero, as C2104 is no longer charged. As a consequence, the voltages will decay and will change polarity. The gate of the FET will be again made positive, is driven into conductivity and the cycle starts again.

Feedback, stabilisation:
The Standby Power Supply always oscillates at maximum power, the only limiting factor is the maximum primary current which has been pre-set with R3108//3118.
U_{OUT} is determined by R3114, R3124 and zenerdiode D6122.
If the voltage across R3114 exceeds the threshold voltage of the diode of the optocoupler 7104 (±1 V) or, in other words, U_{OUT} exceeds 5.2 V, the transistor of the optocoupler will conduct.
Transistor TS7100 will be driven and a negative voltage will be transposed to the emitter of TS7101. When TS7101 conducts, the gate of the FET is at earth potential forcing the oscillator stop. Due to the load, the secondary voltage U_{OUT} will decrease. At a certain voltage, optocoupler TS7103/04 will block and the oscillator will start again.
Since there are no capacitors and there is a high amplification-factor in the feedback circuit, the feedback is ultra-fast. This is why the ripple on U_{OUT} is minimal. The negative supply voltage (-20 V) used in the feedback circuit originates from the co-coupling coil and is rectified through D6103.
Stabilisation is not effected through duty-cycle control but through burst-mode of TS7100.
Burst-mode is load dependent. If the power supply is less loaded, the secondary voltage will have the tendency to increase more rapidly. If the load on the power supply

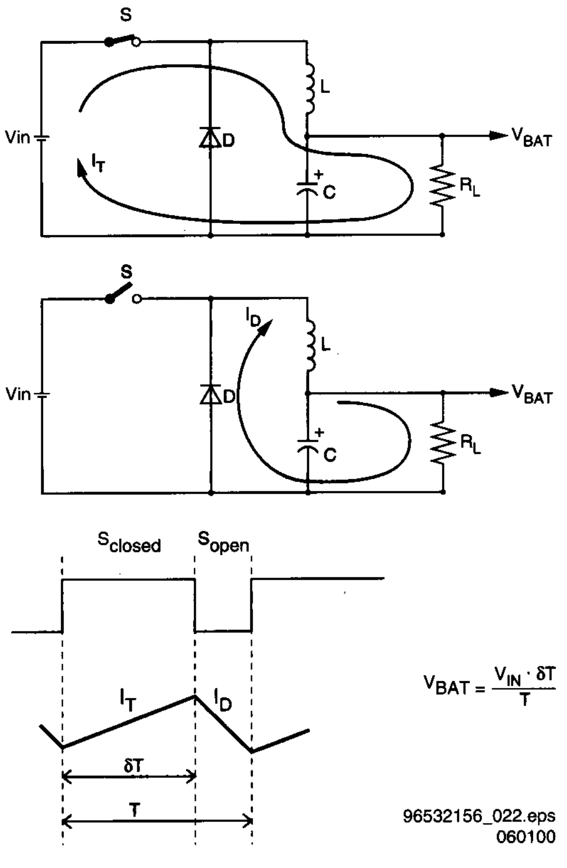
increases, then the oscillator stops less often, right up to the moment that the oscillator is operating continuously: maximum load. If the power supply is now loaded even more, the output voltage will decay. The maximum load is determined by the maximum primary current set by R3108//3118.

Protection:
If the optocoupler would fail, the secondary voltage will increase. This would have disastrous consequences since many IC's (e.g. OTC, flash-RAM, DRAM) are fed with this 5.2 V. In other words, very expensive repairs would be required. We already know that the negative supply is directly dependent upon the secondary 5.2 V, as a consequence of which the negative supply will increase proportionally as the secondary voltage increases.
If the negative supply in the mean time reaches -30 V, D6106 will start to zener and as a consequence TS7101 will start conducting. Basically, D6106 will take over the stabilisation task of the optocoupler, however, with a considerable spread: from -20 V to -30 V is a 50 % increase, thus U_{OUT} will increase from 5.2 V to max. 7.5 V.

Main supply (diagram A1)

Some important notes on beforehand:
- V_{BAT} is not isolated from the mains supply ('hot').
- V_{BAT} is alignment free.

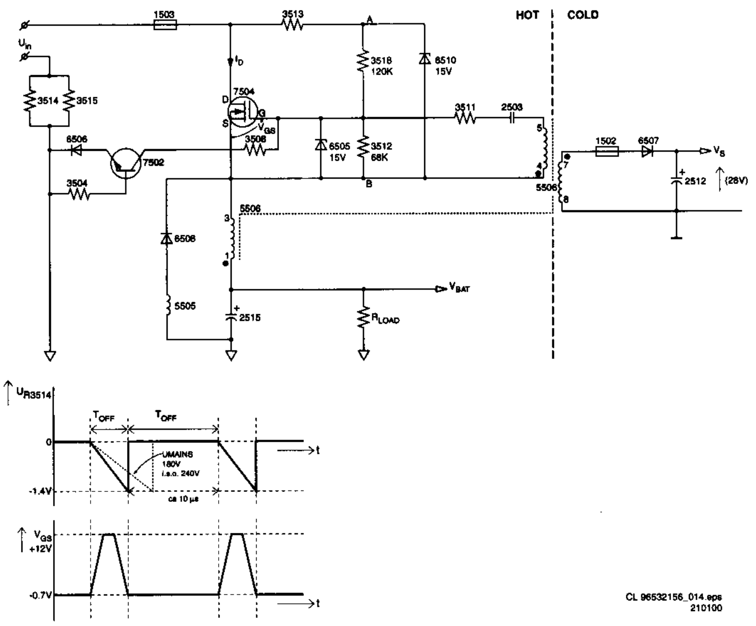
The Main Power Supply, generates the 141 V (V_{BAT}) and the 28 V for the audio part and is based on the so-called 'down converter' principle.



96532156_022.eps
060100

Figure 9-5

- After closing switch 'S', the linear in time increasing current I_T, , will charge capacitor C.
- Opening switch 'S' will generate a counter-e.m.f. in coil L, trying to maintain current I_T. This is possible via diode D (this diode is also called 'freewheel diode'). So after opening 'S', the magnetic energy stored in coil L will be transferred to electrostatic energy in capacitor C. The V_{IN} will only supply current during the time that 'S' is closed while a constant current is flowing through R_L.
- V_{BAT} is directly proportional with V_{IN} and the time that 'S' is closed and reverse proportional with period time 'T'. So by changing the duty cycle, it will be possible to control V_{BAT}.



CL 96532156_014.eps
210100

Figure 9-6

At start-up of the main supply, C2515 can be assumed as being a shortcircuit. U_{AB} will be 15 V (R3513, D6510) and U_{GS} of the FET will be +5.4 V (voltage division over R3512 and R3518). The FET will be driven into saturation (same as closing switch 'S'). The drain-current will increase linear in time. With other words: resistors R3513 and R3518 will start the oscillator. The voltage across the co-coupled coil (4, 5) is also positive and will keep the FET into conductivity.

The drain-current will also flow through R3514//R3515. The voltage on the base of TS7502 will be +0.8 V due to the stabilisation circuit (which is explained further). At increasing current, the emitter-voltage of TS7502 will get more negative. When this voltage reaches -0.7 V, TS7502 will be driven into conductivity and consequently connect the gate of TS7504 to earth; the FET will block (same as opening switch 'S'). The maximum drain-current is: 0.7 V / (R3514//R3515) = 1.4 A. The voltage polarities on L5506 will invert, keeping the gate of TS7504 negative via the co-coupled coil (4, 5). The voltage on the secondary winding of L5506 (7, 8) will be positive, generating the +28 V audio supply voltage via D6507 and C2512.

The sudden current interruption in the primary coil, will induce a counter-e.m.f. that wants to maintain the current via the 'freewheel' diode D6508. This current is linear decreasing in time and as it is also flowing through R3414//R3415, TS7502 will be blocked after a certain time period. The gate of the FET will be again made positive, is driven into conductivity and the cycle starts again.

Stabilisation of V_{BAT}:
The output voltage V_{BAT} will be determined by: $V_{BAT} = V_{IN} * T_{ON} / (T_{ON} + T_{OFF}) = V_{IN}$ * duty-cycle.
To stabilise the output voltage, a feedback loop is implemented, which will reduce T_{ON} when V_{BAT} increases and vice versa.

Via a voltage divider, excisting of (1 %) resistors R3507, R3510 and R3527, a voltage of 2.5 V (when V_{BAT} = 141 V) is fed to the input of precision shunt regulator 7506. This regulator will conduct, a current will flow through R3524 and TS7505 will be driven into conductivity. The base of TS7502 will now be set at a certain positive voltage. As this transistor switches the FET TS7504 on and off, this circuit can determine the dutycycle.

E.g. when the load increases, V_{BAT} will decrease. As a consequence, the input-voltage of regulator 7506 will decrease, resulting in a lower current. Through that the emitter-base voltage of TS7505 will diminish.
The current through R3504 will decline, changing the base-voltage of TS7502 and through that the T_{ON} (will increase) of the FET. The output voltage V_{BAT} will rise.
If the load continues to increase, the regulator will block at a certain moment, the collector-current of TS7505 will now be zero. If there flows no current through R3504, T_{ON} will now be maximum (I_{MAX} = 1.4 A). This is the point where V_{BAT} will be below 141 V, and at further increasing load will be switched off (The voltage across the co-coupled coil (4, 5) will decrease due to the increasing load. Therefore the voltage on the gate of TS7504 comes below the threshold voltage. The supply switches off and an audible hiccuping can be heard).

On the other hand when the load decreases, V_{BAT} will rise. As a consequence, the input-voltage of 7506 will also rise resulting in a higher current. The current through R3504 will rise, changing the base-voltage of TS7502 and through that the T_{ON} (will decrease) of the FET. The output voltage V_{BAT} will be reduced.

If, for instance, V_{IN} will decrease (e.g. U_{MAINS} is 180 V i.s.o. 240 V), the slope of the drain-current will be flattened, through which the FET will be longer into conductance, keeping V_{OUT} constant.

If, for any reason, the stabilisation circuit might fail, the output voltage V_{BAT} can never exceed 200 V (via D6514). D6514 will form a shortcircuit, V_{BAT} will drop and the set will switch off (this will result in an audible hiccuping of the supply).

Set to 'STANDBY" (via RC):
When the set is switched to 'STANDBY' via the Remote Control, the Main supply will be switched off.
This is done by the circuit around TS7529 (see diagram A1):
During 'ON'-state the Main supply is fed with line pulses via the STANDBY line. They are rectified and smoothed via D6517, D6516 and C2530 and fed to TS7529. Because they are less than -20 V, this transistor will be blocked.
When these pulses are stopped (STANDBY), TS7529 will be saturated and TS7502 will be switched off. This will switch off the Main supply.

Set to 'ON' (via 'STANDBY'):
At the moment the set is switched 'ON', the HOP is not working (as much as possible IC's are made voltageless during 'STANDBY'). Therefore it is impossible that the STANDBY line carries line-pulses, so the main supply cannot start up. This problem is solved via the 'low power start-up' possibility of the HOP.
Via pin 22, the HOP receives, via the STANDBY_INFO line from the OTC, a voltage of 5.2 V coming from the Standby supply. The result will be that the HOP will generate pulses with a nominal T_{OFF} and T_{ON} growing from 0 to 30 % of the nominal value.
This signal is unchanged until the Main supply is switched 'ON' and the HOP the correct I^2C-command POR-bit) has received.

Guarding circuit:
The negative pulses on the secondary winding of L5506 are rectified by D6520 and smoothed by C2535. The resulting negative DC-voltage will keep TS7510 blocked, even as TS7511.
When something happens in the Main supply through which these pulses will decrease, the DC-voltage will increase. TS7510 starts to conduct, even as TS7511. Via R3541 and D6522 this situation will be maintained (thyristor principle). The collector of TS7511 drives via R3538 a positive pulse back to the OTC (named STANDBY(POR)). The OTC will now switch off the Main supply via the STANDBY_INFO signal.

SSB

There are 5 different voltages located on the SSB: +33 V, +11D V, +8 V, +5.2 V and +5 V.
+5.2 V is the Standby voltage, it should always be present. The 8 V is derived from the 11D V with stabiliser 7906. The 11D voltage is only present when the line-drive pulses start the deflection.
The 8 V is used to switch the +5.2 V with transistor 7905 to supply the +5 V.

9.1.4 Control (diagram B5)

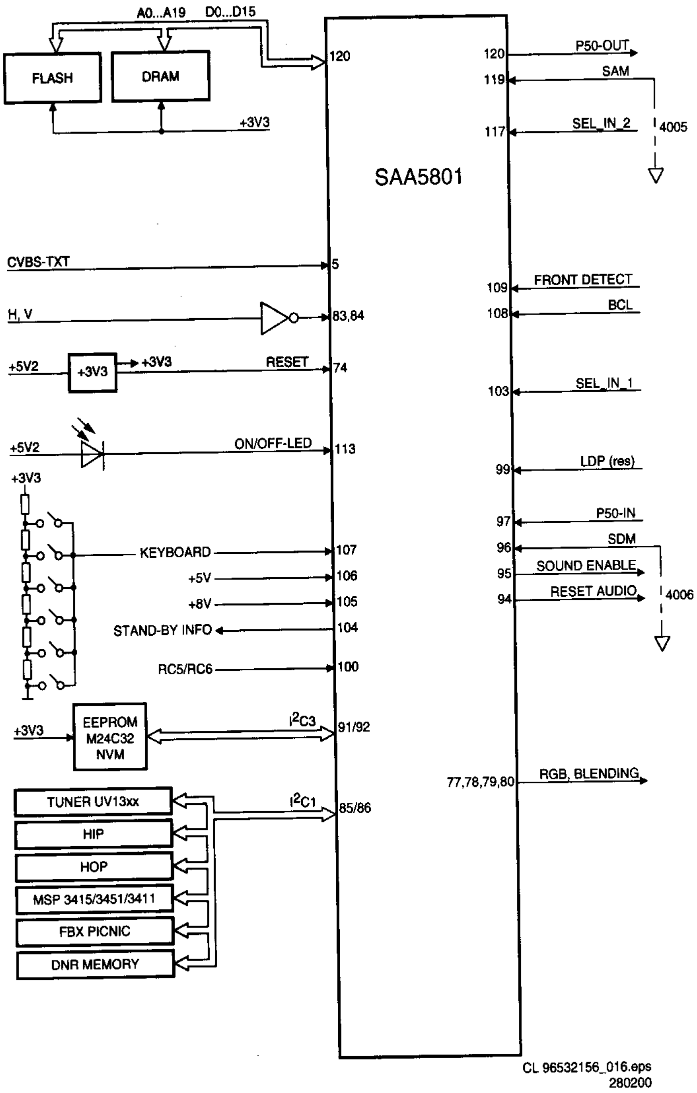

A0...A19
D0...D15
FLASH
DRAM
+3V3
SAA5801
120
P50-OUT
119
SAM
117
SEL_IN_2
4005
CVBS-TXT
5
H, V
83,84
+5V2
+3V3
RESET
74
ON/OFF-LED
113
109
FRONT DETECT
108
BCL
103
SEL_IN_1
99
LDP (res)
97
P50-IN
96
SDM
95
SOUND ENABLE
94
RESET AUDIO
4006
KEYBOARD
107
+5V
106
+8V
105
STAND-BY INFO
104
RC5/RC6
100
EEPROM M24C32 NVM
I²C3
91/92
77,78,79,80
RGB, BLENDING
TUNER UV13xx
HIP
HOP
MSP 3415/3451/3411
FBX PICNIC
DNR MEMORY
I²C1
85/86
CL 96532156_016.eps
280200

Figure 9-7

OTC

The SAA5801 (IC7001) is called the OTC (OSD, TXT and Control). In this IC, the microprocessor and the TXT-decoder (level 2.5) are integrated.
Some of its functions are:

- Set control.
- TXT/OSD acquisition.
- RGB-outputs to the HOP
- Menu blending; for blending the contrast is software controlled.
- I/O-ports for I^{2}C, RC5, LED, and service modes.
- Error code generation.

The software for EM2E can be 2 MB (Megabyte).
For TXT-data 1000 pages can be stored in IC7007. This is a DRAM of 4 Mbit and this IC is also used to store data of a working set.
The Non Volatile Memory IC7011 is a 4 kB version M24C32W6.

All ICs in this part are supplied with 3V3. For this voltage a 3V3 stabiliser is used (IC7005).
When the 3.3 V is available, a POR is generated with TS7003/7004 to wake up the OTC. During the reset all I/O pins are high.
When a POR is generated the TV-set is in Standby mode.

Via pins 105 and 106 the 8 V and the 5 V are sensed. If one of them is not present, the Main supply is switched off (set in protection and the red LED will blink at 3 Hz). The OTC will generate an error code to indicate what was wrong.

The horizontal (HD100) and vertical (VSYNC) sync pulses are also fed to the OTC for stable OSD and TXT.

The RGB-outputs (77/78/79) together with fading (pin 80) are fed to the HOP. The fading pin has a double function: it is used for making a transparent menu and as fast-blanking signal for TXT.

I²C-busses

In the EM2E-chassis with OTC-processor there are two I^{2}C-busses used:

- Slow (max. 100 kHz) hardware I^{2}C-bus (called I^{2}C1), used for all IC communication.
- Separate short bus (called I^{2}C3) for the Non Volatile Memory (NVM) to avoid data corruption.

NVM

The Non Volatile Memory contains all set related data that must be kept permanently, such as:

- Software identification.
- Operational hours.
- Error-codes.
- Option codes.
- All factory alignments.
- Last Status items for the customer + a complete factory recall.
- Txt featuring (keeping habit watch data).
- EPG data.

9.1.5 Tuner & IF (diagram A7 & B2)

The tuner UV1316 is I^{2}C-controlled and is capable of receiving off-air, S- (cable) and Hyperband channels:

• Low	44 - 156 MHz
• Mid	156 - 441 MHz
• High	141 - 865 MHz

The tuning is done via I^{2}C. The reference voltage on pin 9 is 33 V. This voltage is derived from the 180 V (from the LOT) via a resistor of 120 kΩ and a zenerdiode. The OTC together with the HIP control the tuning procedure. There is also automatic switching for the different video systems.

The IF-filter is integrated in a SAW (Surface Acoustic Wave) filter. The type of this filter is depending of the standard(s) that has to be received. Two SAW filters are used: One for filtering picture-IF and the second-one for sound-IF. An extra filter (5403), tuned at 40.4 MHz, is necessary for L/L' sets with 6.5 MHz sound to suppress the neighbour channel.

The output of the tuner is controlled via an IF-amplifier with AGC-control. This is a voltage feedback from pin 62 of the HIP to pin 1 of the tuner. AGC take-over point is adjusted via the service alignment mode 'Tuner AGC'. If there is too much noise in the picture, then it could be that the AGC setting is wrong. The AGC-setting could also be mis-aligned if the picture deforms with perfect signal. The IF-amplifier amplifies too much.

The video IF-signal is fed to pins 2/3 of the PLL-controlled IF-demodulator. The voltage controlled oscillator of the PLL is adjusted via the service menu 'IF AFC'. If the alignment is correct then the displayed frequency in the installation menu is the same as the applied frequency from a generator. The external coil L5408 connected between pins 7/8 is used as reference. The demodulated IF-video signal is available at pin

10 of the HIP. In this video signal there is a rest of sound carrier, which is filtered by the sound trap 1407.
Then the signal is again fed to the HIP on pin 12 where the group delay can be corrected, dependent on the standard that is received. On pin 13 the CVBS-signal becomes available which is used for further processing in the television. Via TS7322 the signal is supplied to EXT1 and back into the HIP on pin 14 to the source/record selection.

To realise quasi split sound the IF-signal is fed to the HIP on pin 63/64 via SAW-filter 1405. The FM (or AM for L-norm) - modulated signal is available on pin 5 and is fed to the audio demodulator MSP34xx.

9.1.6 Video: High-end Input Processor (HIP, diagram B2))

In the EM2E the TDA932xH input processor is used, which contains the following functions:
- IF demodulation.
- Group delay correction.
- AFC signal generation, used to track drifting transmitters.
- Sound carrier re-generation (SIF).
- AM demodulation.
- Sync acquisition, delivering HA and VA.
- Switching off IF-filtering.

The HIP has various inputs.
- Full matrix switch with:
  - 2 CVBS inputs
  - 2 Y/C (or additional CVBS) inputs
  - 1 CVBS front end input
- Two RGB inputs and 2 status-inputs

Outputs: Three separate switchable outputs can be used:
- 1 YUV-output is fed to the PICNIC
- 2 CVBS outputs: One for Teletext Dual Screen and the other for output to EXT2 to have WYSIWYR (What you see is what you record)

I/O-switching: The external signals are fed directly to the I/O part of the HIP with status from pin 8 of SCART. On the HIP there are two status inputs available (pins 15, 17) with two voltage levels:
- 4:3 -> 2.2 V
- 16:9 -> 5.5 V

The input signals from the Front I/O are fed to the HIP and front detection is also fed to the OTC.
EXT1 is full SCART: thus CVBS and RGB. The RGB-selection is done in the HIP.
EXT2 is meant for VCR and has therefore some additional signals in relation to EXT1 but no RGB. EXT2 has also the possibility for Y/C_in and Easylink-Plus (P50). Y_in is with pin 20 and Chroma in with pin 15. Easylink is handled via pin 10 of the SCART and this is a bi-directional communication.

Easylink supports the next features:
- Signal quality and aspect ratio matching
- One touch play
- One touch text
- PIP
- Pre-set download
- WYSIWYR
- Automatic Standby

With Easylink-Plus is added:
- Country and language installation
- System Standby
- Intelligent set top box features
- NexTView download
- Timer record control
- VCR control feature

Video processing
The sandcastle-pulse of the HIP will not be used for synchronisation. The HOP will generate synchronisation signal derived from the feature box (PICNIC) signals. If a VCR is connected, there is also an automatic correction for Macrovision. This is active for the external sources and the pre-sets 0, 90-99.
The HIP itself (no external voltage) controls the Y/C switch in the HIP.
The chrominance decoder in the HIP is full multistandard: PAL/SECAM/NTSC.
Two different crystals can be connected to the pins 54 & 57 without any alignment. The crystals are also used as a reference for the synchronisation. A digital control circuit that is locked to the reference signal of the colour decoder determines the start-up of the sync. This crystal may only be replaced by the original one. If just a crystal is taken, the internal capacitance will be different and the effect will be that there is no colour.
In the HIP a sync separation has been integrated; the HIP delivers the HA and VA 50Hz/60Hz to the PICNIC. On pin 59 there is the 1fH sandcastle but this is not connected to any circuit and only used internally for the colour demodulator. The 2fH-sandcastle signal is generated by the HOP.

9.1.7 Video: Feature box (PICNIC, diagram B3))

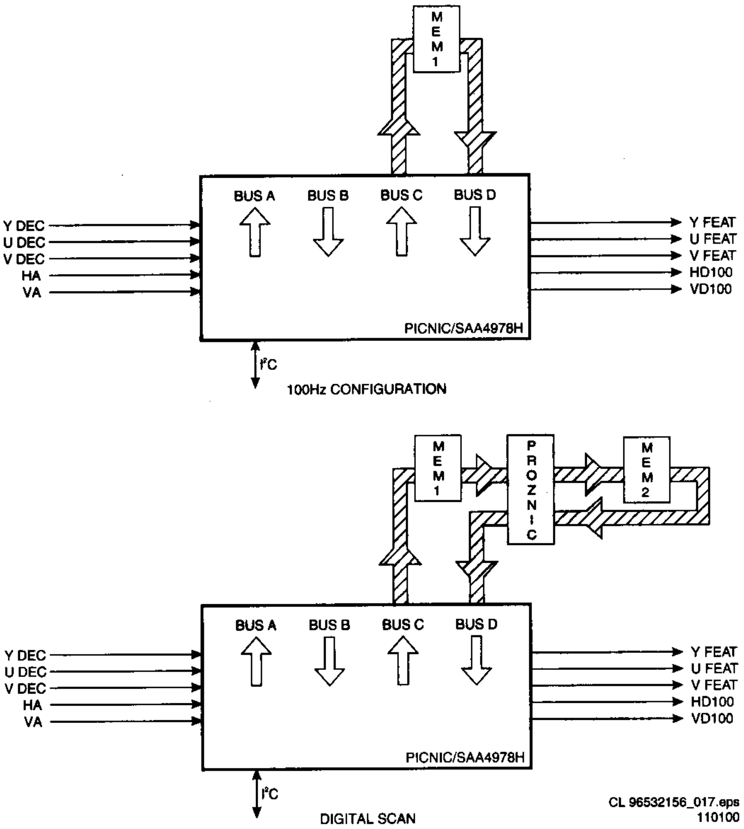
Introduction
The basic function of the Feature box (FBX6) is picture improvement, and depending on the version, several scan conversion methods can be applied. The PICNIC (SAA4978H) is the central key component.
In the EM2E-chassis the featurebox is integrated on the SSB. The PICNIC is used for the 100Hz conversion. In the PICNIC the following functions are present:
- The ADC.
- The DAC.
- The 100 Hz conversion.
- The Panorama mode.
- The noise limiter (DNR).
- The contrast improvement.

All these functions are integrated in one IC: SAA4978H, 160 pins QFP

ADC/DAC
Analogue to Digital conversion is done with three identical 9-bit ADC's.
Digital to Analogue conversion uses three identical 10-bit DAC's.
In the PICNIC there are three 9 bits ADCs present for Y,U,V. For digitising the Y (luminance) 9 bits are used, to realise a more detailed picture. The 9 bits are only internally used. Via dithering the 9 bits are reduced to 8 bits and that data is stored into the memory. The data in the memory is fed back to the PICNIC and via undithering the data is again reproduced 9 bits for processing.
U/V (colour difference signals) is also sampled with 9 bits. These two 9 bit data streams are multiplexed to 4 bits data streams. This reduction can be allowed, as the perception for colours by the human eye is less sensitive as for luminance.

100 Hz conversion
The main task of the PICNIC is the conversion from 50Hz to 100Hz for YUV and HV-sync. In order to remove 'large area flicker' (especially visible in a white picture), the field-rate of the video is doubled by the FBX6. A 50/60 Hz frame frequency is converted to 100/120 Hz. Also the line frequency (16 kHz) is doubled (32 kHz). Basically, when the video input contains fields A, B etc..., the conversion provides an AABB sequence on the display. The actual conversion is done in the first Field Memory by reading it twice at double speed, while writing it once.

PROZONIC



CL 96532156_017.eps
110100

Figure 9-8

To the PICNIC external IC's are connected dependent of the features.
If EM2E has only 100Hz then only one memory-IC is used to store one frame.
For sets with Digital Scan the PROZONIC (IC7708, SAA4990H) has been added with two memory-ICs (IC7714/7715). It is an abbreviation for PROgressive scan Zoom and Noise reduction IC.
When applying this, the 2nd Field Memory has to be installed.
The following functions are available:

- Line flicker reduction (Digital Scan): this is a feature to reduce the 25 Hz interlace line flicker.
- Dynamic Noise Reduction: noise affected signals can be improved by combining the pixel values of the current and past video fields. This is however only possible in areas without movement.
- Variable Vertical Sample Rate Conversion
- Synchronous No Parity Eight bit Reception an Transmission interface (SNERT-bus)

Depending on the chassis model, the FBX6 can have the following specification:

Featurebox 6 diversity	
Set	Chipset
EMG 1fH	
EMG 2fH	1 Memory
EMG 2fH DNR	1 Memory incl. DNR
EMG 2fH Dig. Scan	PROZONIC + 2 Memories

Dual Screen compression

The PICNIC can provide horizontal video compression up to 50 %. The compress mode can be used to display dual screens for instance with Teletext (only for widescreen sets).

Panorama

To fit 4:3 pictures into a 16:9 display, a panoramic horizontal distortion can be applied to make a screen-fitting picture without having black sidebars or lost video.

The centre horizontal gain is programmable and the side gain is automatically adapted to make a screen-fit.

Automatic Aspect Ratio Adaptation (AARA)

This feature uses data from the 'black bar detection circuit' to adapt the vertical and horizontal amplitude to an aspect ratio belonging to the display without showing the black bars.

CTI

At CVBS video signals, the bandwidth of colour signals is limited to 1/4 of the luminance bandwidth. Transients between areas of different colours are therefore not very sharp. The PICNIC can steepen these transients artificially with a time manipulation algorithm.

Dynamic Contrast

To make the contrast (black/white) range wider, Philips has invented Dynamic Contrast. It uses the digital memory used in 100 Hz sets. It measures every A-field (25x/s) and digitally analyses where on the greyscale most of the image is located. If it's a relatively dark image, the lighter part of that image is stretched towards white, so that more contrast will become visible in that picture. If it's a relatively light image, the darker part of that image is stretched towards black, so that these darker parts will have more contrast. When the image is in the middle of the greyscale, both dark and light parts are stretched.

9.1.8 Video: High-end Output Processor (HOP, diagram B4)

General

In the HOP (High-end Output Processor, TDA9330) the video processor and digital deflection processor are integrated. The main functions of the HOP are:

- Video control (contrast, brightness, saturation, etc.).
- 2nd RGB interface for OSD/TXT.
- Peak White Limiting.
- Cut-off control and White Drive (RGB outputs).
- Geometry control.

The YUV-signals from the PICNIC are fed to the HOP. In the HOP, the video and geometry control parts are integrated. Also the RGB-signals from TXT/OSD are inserted via the HOP. This IC has all functions from a video processor and geometry control (like the DDP in MD2). The geometry part delivers the H-drive, EW-drive and also a drive signal for rotation. The internal V-drive circuit of the HOP is not used (is explained further on).

Video Control

After conversion to RGB again, the signals can be controlled for Saturation, Contrast and Brightness.

2nd RGB interface for OSD/TXT

On pins 35 - 38 the RGB and fast blanking from the OTC (OSD and TXT) are inserted.

Peak White Limiting

On pin 43 there is a Peak White Limiting signal line (PWL). If the beam current (EHT-info line) increases, then the EHT-info voltage will decrease. PWL is controlled by average limiting via R3343/C2333.

Cut-off control

Switching the TV to Standby:

1. Vertical scan is completed.
2. Vertical flyback is completed (the horizontal output is gated with the flyback pulse, so that the horizontal output transistor cannot be switched on during the flyback pulse).
3. Slow stop of the horizontal output is started, by gradually reducing the 'on' time at the horizontal output from nominal to zero (this will take 50 ms).

4. At the same time the fixed beam current is forced via the black current loop for 25 ms. This is done by setting the RGB outputs to a maximum voltage of 5.6V.

In the EM2E a 'one-point' cut-off control is used:
A current of 8 µA (for cut-off) is fed to pin 44 of the HOP. This is done with a measurement pulse during the frame flyback. During the 1st frame, 3 pulses are generated to adjust the cut-off voltage at a current of 8 µA.With this measurement the black level at the RGB-outputs is adjusted. So at start-up there is no monitor pulse anymore. At start-up, the HOP measures the pulses which come back via pin 44. The RGB-outputs have to be between 1.5 V and 3.5 V. If one of the outputs is higher than 3.5 V or one of them lower then 1.5 V, the RGB-outputs will be blanked.

Geometry control
All geometry control is done via I^{2}C and the data is stored in the NVM (IC7011) of the SSB.

Line drive (LINEDRIVE1).
Line drive is derived from an internal VCO of 13.75 MHz. As a reference an external resonator is used (1301). The internal VCO is locked with the HD100-pulse, which comes from the PICNIC. The 'PHI-2' part in the HOP receives the HFB_X-RAY_PROT (pin 13) to correct the phase of the line drive. The EHT-info is supplied to pin 14 (DYN-PHASE-CORR) to compensate picture breathing depending on the beam current. Service tip: This is not used at the moment, therefore EHT-compensation in the service menu is put to zero.

Frame drive (FRAMEDRIVE+).
The VD100 signal from the PICNIC will be extended for 16.5 lines by the circuit around TS7309 and 7311. The resulting signal (VDHOP) will drive TS7310. This will result in the (asymmetric) FRAMEDRIVE+ signal.
Note: The Frame outputs (pins 1/2) of the HOP are not used!

East/West drive.
At pin 3 the E/W-drive is available. Pin 4 is a feedback input for the EHT-info and is used to prevent pumping of the picture. EHT varies also dependent of the beam current. For widescreen without load this is 31.5 kV and with load (1.5 mA) 29.5 kV.

Frame rotation (only for 16:9 sets):
For frame rotation a control voltage is used from pin 25 of the HOP. This voltage can vary from 0.4 V till 4 V.

Guarding protections:
- Flash detection:

When a flash occurs, the EHT-info will become negative very fast. Via D6303/D6304/R3316, TS7303 starts to conduct. This makes pin 5 of HOP high. When pin 5 of HOP is high, then the output (pin 8) is immediately stopped. If H-drive stops then also pin 5 will be low again, which will reset the flash detection. A bit (FLS) will be set in an output status register, so via the OTC it can be seen when there was a flash. This FLS-bit will be reset when the OTC has read that register.

- HFB protection:

If the HFB is not present then this detected via the HOP. The OTC puts the TV into protection and reads a register in the HOP. An error code will be generated.

9.1.9 Synchronisation (diagram B3 & B4)

The HIP video processor provides vertical and horizontal sync pulses VA and HA that are synchronised with the incoming CVBS signal. These pulses are fed to the PICNIC where they are doubled to be synchronous with the 100 Hz picture. The outgoing pulses, VD100 and HD100 are fed to the HOP that supplies the vertical and horizontal drive pulses and the 100 Hz (2fH) sandcastle pulse.

The VD100 pulse from the PICNIC is only one line long. Therefore this pulse is converted into a VDHOP signal by a 530 µs monostable oscillator (extended by 16.5 lines). This signal is on block function level equal to VSYNC and FRAMEDRIVE+.

The OTC is synchronised on the HD100 pulse from the FBX and on the VSYNC for the synchronisation of TXT/OSD/EPG

When no CVBS is offered to the video processor, the VA and HA pulses are switched off by the HIP, and the VD and HD pulses are then generated by the PICNIC. This to assure a stable OSD.

9.1.10 Horizontal (line) deflection (diagram A3)

Driving the line output stage

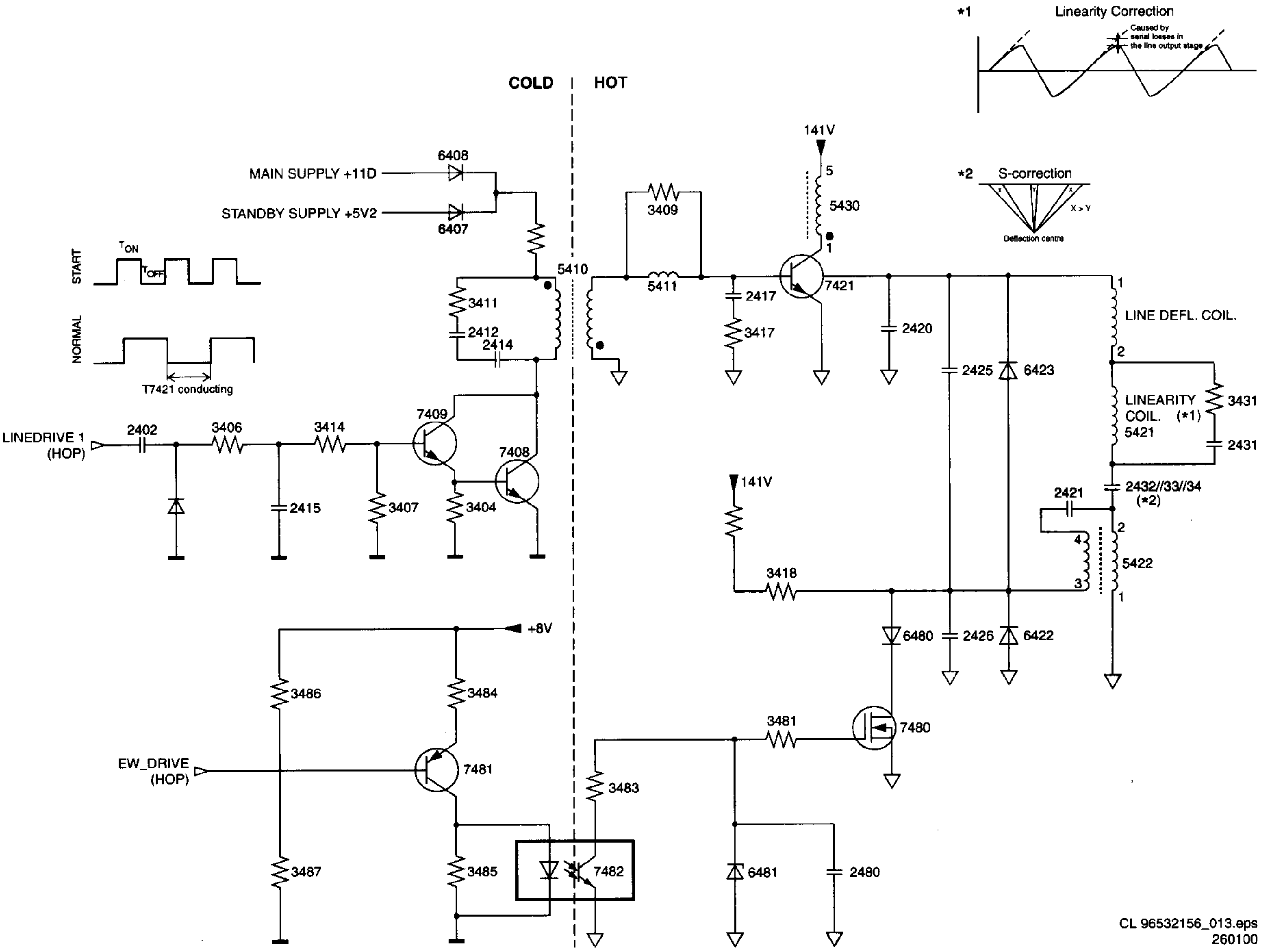

*1 Linearity Correction
Caused by serial losses in the line output stage
*2 S-correction
X > Y
Deflection centre
COLD
HOT
MAIN SUPPLY +11D
STANDBY SUPPLY +5V2
6408
6407
START
NORMAL
TON
TOFF
T7421 conducting
LINEDRIVE 1 (HOP)
2402
3406
3414
2415
3407
3404
7409
7408
3411
2412
2414
5410
3409
5411
2417
3417
141V
5
5430
1
7421
2420
2425
6423
LINE DEFL. COIL.
2
LINEARITY COIL. (*1) 5421
3431
2431
2421
2432//33//34 (*2)
4
3
5422
3418
6480
2426
6422
+8V
3486
3484
EW_DRIVE (HOP)
7481
3487
3485
7482
3483
3481
7480
6481
2480
CL 96532156_013.eps
260100

Figure 9-9

The HOP (located on the SSB) generates the line-drive pulses (LINEDRIVE1), which have a frequency of 31250 Hz (T = 32 µs).

When the LINEDRIVE1 signal is high, TS7409 and TS7408 will conduct. A constant DC voltage will be applied across L5410, causing a linear increasing current through this coil. The secondary voltage of L5410 has a negative polarity so that TS7421 will block. When switching on the set, the current through L5410 is supplied by the 5V2 Standby supply (via D6407), and taken over by the +11D voltage (via D6408) of the main supply.

When the LINEDRIVE1 signal becomes low, TS7409 and TS7408 will block. The voltage polarity across the primary winding of L5410 will invert. The positive voltage on the secondary winding will now drive TS7421 into conductivity. Because of the storage time of the line transistor (TS7421), L5410 cannot transfer its energy immediately to the secondary side. This may result in high voltage peaks on the collector of TS7409 and TS7408. To prevent that these peaks will damage the transistors, a 'snubber' circuit (C2414, C2412 and R3411) will suppress them.

When the LINEDRIVE1 signal is high again, the above-described sequence starts again. Circuit L5411 and R3409 will increase the switch-off time of the line transistor.

The line stage will be started via the 'slow start' principle. During start-up, the HOP generates line drive pulses with a small T_{ON} and a high frequency (50 kHz); T_{OFF} will be constant and T_{ON} will be gradually increased until the duty-cycle is 50 % (normal condition). The time interval from start to normal condition takes about 150 ms. When switching off, the same procedure is followed, but now in reverse order.

Operation of the line output stage

To explain the operation of the line output stage, we use the following start conditions:

- C2433 is charged to max. 141 V (V_{BAT})
- TS7421 is driven into conductivity.

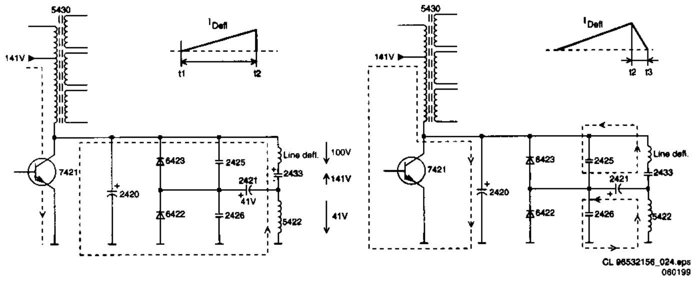
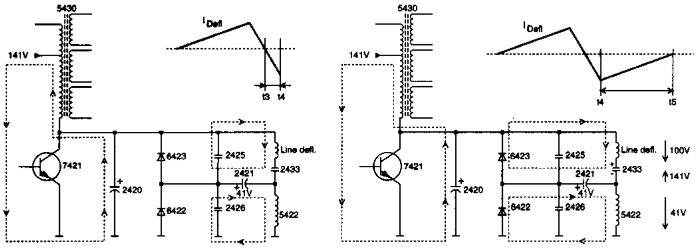

5430
141V
7421
2420
6423
2425
2421
41V
6422
2426
5422
2433
Line defl.
100V
141V
41V
IDefl
t1
t2
t3
CL 96532156_024.eps
060199

Figure 9-10

Period t1 - t2:
When TS7421 is driven into conductivity, the capacitor voltage of 141 V, will be divided across bridgecoil L5422 and the deflection coil (conn. 0317). Due to the chosen inductance values, there will be 100 V across the deflection coil and 41 V across L5422. The linear increasing current in the deflection coil will result in a spot moving from the centre of the picture tube to the right.
The voltage across L5422 will also charge C2421 (41 V - 0.7 V).

Period t2 - t3:
At the moment the LINEDRIVE signal becomes high, TS7421 will stop conducting. In the coils a voltage will be induced, trying to maintain the current. The current through the line deflection coils continues to flow through C2425 and C2421 and the current through L5422 continues to flow through C2426 and C2421. The energy stored in the line deflection coil is passed to C2425, and the energy of L5422 to C2426.
The resonance-frequencies of these 2 LC-circuits define the flyback time of the spot from the right side of the picture tube to the left.
On average no current flows through C2421 and thus the voltage across this capacitor remains constant.



CL 96532156_025.eps
231299

Figure 9-11

Period t3 - t4:
As for the period t2 - t3; but now the current flows in the opposite direction, since the voltage across C2425 and C2426 is higher than the voltage across C2433 and C2421.

Period t4 - t5:
The coils want to maintain the negative current and will charge the capacitors negative. Because of this, D6422 and D6423 will conduct. The voltage is 100 V across the deflection coil and 41 V across L5422. As both diodes conduct, we may consider the voltage to be constant. A linear current flows with the same changing characteristics as in period t1 - t2. The spot now moves from the extreme left of the picture tube to the centre. Before the current becomes zero, and the spot is located in the centre of the frame, TS7421 reverts back into conductivity. First a short negative current will flow. The cycle starts again.

The linearity correction

A constant voltage across the horizontal deflection coil should result in a linear increasing saw-tooth current. This however is not the case as the resistance of the coil is not negligible. In order to compensate for this, a pre-magnetised coil L5421 in series with the deflection coil is used. This coil ensures that during time interval t1 - t3 the circuit-resistance will be higher than during t4 - t5. L5421 is called the linearity coil.
To avoid self-oscillation, R3431 and C2431 are placed parallel to L5421.

The S-correction

Since the sides of the picture are further away from the point of deflection than the centre, a linear saw-tooth current would result in a non-linear image (the centre would be scanned slower than the sides). To solve this, the deflection current for the right- and left side will be reduced.
C2433 is charged quadratic during time interval t1 - t2. Left and right the voltage across the deflection coil decreases, causing the deflection to slow down. In the centre, the voltage increases and the deflection will be faster. An S-shaped current will have to be superimposed onto the saw-tooth current. This correction is called finger-length correction or S-correction. C2433 is relatively small, as a result of which the saw-tooth current will generate a parabolic voltage with negative voltage peaks.. The current also results in a parabolic voltage across C2421, resulting in the finger-length correction, proportionally increasing with the picture width. The EW-DRIVE signal will ensure the largest picture width in the centre of the frame. Here the largest correction is applied. The larger the picture width, the higher the deflection current through C2433.

The E/W-correction

A line, written at the upper- or lower side of the screen, will be larger at the screen centre when a fixed deflection current is used. Therefore the amplitude of the deflection current must be increased when the spot approaches the screen centre. This is called East/West correction.
The EW-DRIVE signal is generated in the HOP and will drive FET TS7480 via TS7481 and optocoupler TS7482. TS7480 will charge capacitor C2423 more or less, increasing the deflection current when reaching the centre of the screen.

Secondary line-voltages

During the blocking time of TS7421, the magnetic energy of coil 1 - 5 of the LOT will be transferred to electrical energy in the secondary winding. Via rectifying and smoothing, the several secondary supply voltages will be generated:

- EHT, Focus and Vg2-voltage
- +180V for the CRT panel (pin 8 LOT)
- +11D for the line deflection (pin 12 LOT)
- +13VLOT for the frame deflection (pin 6 LOT)
- -15VLOT for the frame deflection (pin 3 LOT)
- Filament voltage (pin 9 LOT)

The EHT-INFO signal is derived via R3450//R3451. This signal decreases while the beam current increases. It is fed to the HOP to compensate for loss of picture width and picture height.

The DYN-FASE-CORR signal is fed to the HOP via C2455 and drives a dynamic phase correction necessary because of beam current variations. This is done by regulating T_{ON} of the line transistor TS7421.

East-West circuit

The moment TS7480 is driven into saturation, C2421 will discharge during the flyback. As a consequence of which C2421 must be charged again during the scan via the conduction diode D6422 (as long as C2421 is not charged to the voltage across L5422, D6422 will conduct). The current in the deflection coil is therefore larger than the current flowing in L5422 (1-2). The voltage across the deflection coil increases, so the picture width increases. When TS7480 blocks, C2421 will not discharge anymore and the voltage across C2421 will remain constant. The result is that the voltage across the deflection coil is minimal. The voltage across coil L5422, however, is maximal. This coil (L5422) consists of a transformer:

- As the current through the coil 1-2 increases (smaller picture width), the current through coil 3-4 decreases. Because of the transformer characteristic a higher voltage will be subjected to coil 3-4, which will counteract the current. The current will diminish even further.
- When the current through coil 1-2 diminishes (larger picture width), the current through coil 3-4 increases.

The EW Drive

The EW drive signal originates in the HOP and is supplied to TS7480. The shape of this signal determines the various geometric correction parameters:

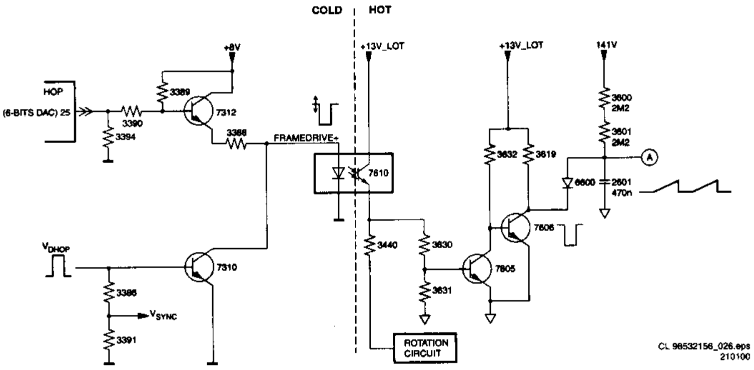
- H amplitude
- EW-parabola
- EW-corner
- EW-trapezium
- Horizontal parallelogram
- Horizontal bow

Beam current correction

The EHT-info at point 10 of the LOT is dependent on the value of the beam current and the voltage divider R3450, R3451 and C2450. The EHT-info is fed to the HOP to trim the contrast and to compensate for the changes in picture-width as a function of the EHT-info, when the high-voltage is decreased. The EHT-info is integrated via C2450 and sent to the gate of the E/W FET (TS7480) as a DC-voltage to correct the EW-current.

9.1.11 Vertical (frame) deflection (diagram A4)

Driving the frame output stage



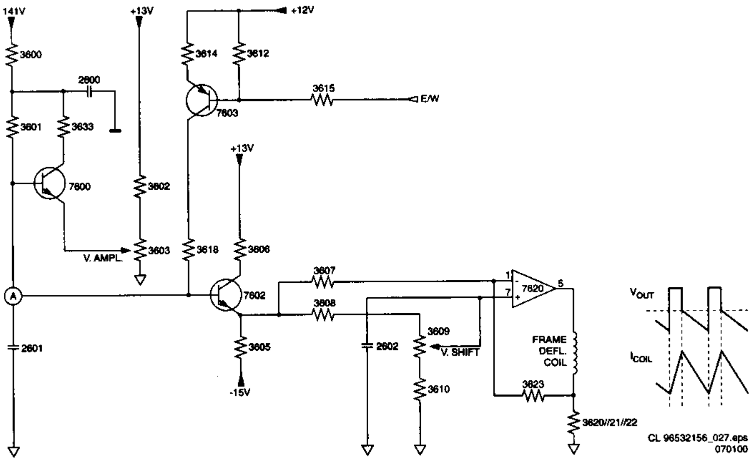
CL 96532156_026.eps
210100

Figure 9-12

The HOP drives the frame output stage. As the HOP is 'cold' and the frame output stage is 'hot', they must be galvanic isolated by means of an optocoupler. In the MG-chassis the HOP generates 3 signals needed for the frame output stage: VDPOS, VDNEG and FRAME ROTATION. To avoid the costs of 3 optocouplers, the frame drive pulse and rotation DC-voltage are added together and then fed to optocoupler TS7610.

This is done as follows: The VD100 signal from the PICNIC (diagram B3 pin 19) is extended for 16.5 lines and inverted via a monostable multivibrator (TS7311 & TS7309, diagram B4). The output signal VDHOP is then superimposed on a DC-voltage from pin 25 of the HOP. The resulting signal is called FRAMEDRIVE+ and is fed to optocoupler 7610 (diagram A4). So this signal contains info for both the frame deflection and the frame rotation.

The circuit around IC7440 will amplify this signal and the output current will flow through the rotation coil. The vertical pulses on this signal are filtered by C2445 to ensure that only a DC-voltage will be supplied to the rotation coil.
The output voltage of the rotation circuit is between -8 and +8 V.



CL 96532156_027.eps
070100

Figure 9-13

The sawtooth voltage for the frame output stage is not generated by the HOP but by a discrete circuit after the optocoupler 7610: via R3600 and R3601 a linear increasing voltage over C2601 is built up with a large time constant.

The circuit around TS7603 is a current source, driving C2601 with a current value derived from the E/W modulator. This will result in an S-shaped voltage on C2601 (also known as EW-correction).

Flyback generator

The frame output stage is supplied via the +13 V and -15 V coming from the LOT. The output of the amplifier is 0 V_{DC}, so a coupling capacitor is not required.

During the (forward) scan, a supply of +13 and -15 V is sufficient to respond to the slow changing current. The flyback generator puts a voltage of -15 V on pin 3. Because of the voltage drop over zenerdiode D6622 (8.2 V), C2622 will be charged to 19 V: being 13 + (15 - 8.2 - 0.7) V.
During the flyback scan, the change in current per time is much larger, so a higher voltage is required. The flyback generator will now generate a voltage of +13 V on pin 3. Added to the charge on C2622 this will give a flyback voltage of 32 V (depending on the CRT size, this value can differ).

The IC amplifier (IC7620, pin 5) supplies the sawtooth current to the frame deflection coil. The current through this coil is measured via R3620//R3621//R3622 and fed back to the inverting input of the amplifier.
R3624 and C2624 on the output of the amplifier, form a filter for high frequencies and in that way also prevents oscillations. Peak voltages on the output, e.g. as a result of a possible flash, are damped by the clamp circuit consisting of D6619, C2627 and R3627. The network consisting of R3625, R3629 and C2629 form an extra damping circuit.

Protection circuit for bridge-coil and frame output stage

The secondary voltage of bridge coil L5422 is guarded at the diode modulator (D6421/22) via a detection circuit consisting of an 8.2 V zenerdiode (diagram A3). When the bridge-coil is working properly, the average voltage on D6422 is such that this zenerdiode will conduct and will drive TS7652 into saturation via the BRIDGE_PROT signal (see diagram A4). When, for any reason, the secondary side of the bridge-coil is shorted, the average voltage on D6422 will drop below the zener-voltage and TS7652 will block. Now capacitor C2642 will be charged. Transistor TS7407 will start conducting and the STANDBY signal will be grounded via R3403. This will switch off the main supply (see diagram A1).

Via the circuit built around TS7641 the frame output stage is guarded. If the frame output stage is working properly, TS7641 and TS7652 will both conduct and thereby discharging C2642. TS7407 is blocked now, causing the STANDBY signal to be high-ohmic.
If there are frame pulses missing, TS7641 will block and capacitor C2642 can be charged. Transistor TS7407 will now start conducting and the STANDBY signal will be grounded via R3403. This will switch off the main supply (see diagram A1).

9.1.12 Audio (diagram B6, A5 & A6)

Introduction
All EM2E sets contain one of ITT's Multistandard Sound Processing IC's for sound decoding. The diversity arises because each member of the MSP-family handles its own set of sound standards:

- MSP3415D: Europe & AP decoding, Stereo incl. NICAM.
- MSP3451G: Global decoding, Virtual Dolby.

This IC takes care of the main FM sound decoding. AM decoding for the L system is done by the HIP. The demodulated L sound is then again source selected and processed in the MSP. The reason for this is the bad AM detection performance of the MSP. In case of NICAM L however, this is handled by the MSP.

All MSP versions contain digital audio processing, used for the basic left/right stereo sound, such as bass, treble, balance, incredible sound and spatial. In addition to that, the MSP3451 is also able to perform Virtual Dolby, a Dolby approved sound mode for surround sound reproduction with left/right speakers only.

Audio source selection

- MSP3515D (stereo)

This IC is an economised version of the MSP3410 that is used in the MG-chassis. It can cover 2 stereo and 1 mono (AM) input. Since more inputs are required, a separate source selector is used (HEF4052, IC7675). This selector has EXT1, EXT2, FRONT and SC1-OUT (Tuner) as input and is connected to the SCART1 input of the MSP3415. The SCART2 input is not used.

Since the MSP3415 has only one SCART output, which is connected to the SCART1, a constant level output and connection to SCART2 is not available. This is fixed by connecting the HEF4052 input selector to the constant level output and to SCART2 via a so-called 'Régimbeau' switch (IC7652).
This switch is needed to prevent feedback (Larsen effect). When EXT2 is chosen as input signal, and the output of SCART2 is selected, this means that the main picture is also EXT2 and will cause the Larsen effect. To prevent this, the record select must be switched to Tuner. This is especially important when decoders are used, behind a 'transparent' VCR connected to EXT2.

To get a constant level output if the Tuner is selected, the SCART1 output (Tuner at any time), has to be fed back to the input selector and selected as input for the MSP (SCART1 input).

The MSP3415 has no separate output to drive a headphone. The headphone is therefore hardwired (on the LSP) to the main sound output.

- MSP3451G (Virtual Dolby)

The MSP3451, which is used in all versions supporting Virtual Dolby, is capable of supporting 4 stereo inputs and 1 mono (AM) INPUT. Therefore the extra input selector (HEF4052) is not needed.

The MSP3451 is also capable of supporting 2 SCART outputs, so the trick used in the MSP3415 set-up to get a constant level output is not needed.

The MSP3451 has a separate headphone output, so sound control be done separate from the speakers.

Audio decoding
At the input a choice can be made between two IF-signals; SIF and SIFM.
The selected signal is fed to the AGC. After this, an ADC converts the IF-signal to digital.

This digital signal can be processed by 2 demodulation channels. The first one is able to handle FM and NICAM signals. The second one can handle FM and AM signals.

Each channel contains a mixer to shift the incoming signal in the frequency domain. This shift is determined by the value of a DCO.

After the down-mix, the signal is fed, via a filter, to a discriminator. From here the AM, FM or NICAM demodulation can be performed.

Both channels contain an 'automatic carrier mute' function, which automatically mutes the output of the analogue section when no carrier is detected.

After demodulation, the FM-signals are subjected to a de-emphasis operation. After that the matrix of the stereo system is applied.

Audio processing
The sound processing in EM2E is completely done by the MSP3415D for 'Stereo' sets or the MSP3451G for 'Virtual Dolby' sets:

- Volume control is done by the user via the SOUND menu.
- Tone control in 'Stereo' sets is done via the BASS/TREBLE control, in 'Virtual Dolby' sets via the 5-band equaliser.
- Headphone control in 'Stereo'-sets is done via the loudspeaker output of the MSP, no sound control possible. In 'Virtual Dolby'-sets, the MSP has a separate Headphone output so separate sound control is possible.
- Mute control can be done in different ways:
  - Via the SOUND_ENABLE line of the OTC. Used during start-up/switch-off conditions, in order to avoid audible plops.
  - Via the decoding part of the MSP.
  - Via the processing part of the MSP.

The mute on the RC or in the UI is per today a combination of processing mute and SOUND_ENABLE line. When a user mute is done, the processing mute will turn down the volume, after which the SOUND_ENABLE line is switched. De-muting is the other way around. The reasons for this is a technical problem with crosstalk of the headphone into the loudspeakers.

Automatic Volume Levelling (AVL)
One of the features of the MSP-family is AVL. If used, it limits the big volume differences in the broadcast between e.g. news transmissions and commercials or within a movie.
To be able to get a Dolby approval (for the Virtual Dolby sets), the AVL feature must be switchable. Therefore, the AVL feature is customer switchable via the menu.

Audio amplification
The audio amplifier part is very straight forward. It uses an integrated power amplifier IC, the TDA2616. It delivers an

output of 2 x 10 WRMS to 2 full range speakers. A subwoofer is not implemented.

The supply voltage is +28 V, generated by the main supply via L5506.

Muting is done via the SOUND-ENABLE line connected to pin 2 of the amplifier-IC and coming from the OTC. This signal is inverted by TS7730, as a result of which at a high level of the SOUND-ENABLE signal, current is sinked from pin 2 and the IC mutes.

9.1.13 Teletext / NexTView (diagram B5)

Teletext

The TXT-decoder in the OTC gets its video signal directly on pin 5 (from the HIP).
The RGB-outputs are available on pins 77/78/79. Fast blanking is realised via pen 80.
In the previous chassis there was separate memory to store the TXT information. In EM2E the DRAM (IC7007) of the microprocessor is also used for the TXT-decoder.

NexTView

NexTView allows the user to display a program guide on the TV screen that contains extensive information for each program.

This information can be displayed in a number of different summaries:

- DAY: The daily summary shows, from the current moment, the program schedule for several stations for a short time ahead.
- CHANNEL: The channel summary shows the program schedule for one station.
- THEME: The theme summary shows, for each theme, the program schedule of the various stations. These themes consist of sport, film, culture, etc. and is determined from the station side.

NexTView does not have to restrict itself to information about the station that is being viewed, but also offers information about other stations. In the various summaries 3 different commands can be given for the various program overviews. These commands appear as follows:

- WATCH: The set immediately switches over to the station concerned.
- REMINDER: The start time and date and the station of the program concerned is stored in the TV reminder list. The TV will give an OSD-message with the program information, or switch on the set at the correct moment (provided the set is in Standby) and tune to the station concerned.
- RECORD: The timer of the video recorder with 'Easylink Plus' is programmed with the data of the program concerned. There has to be a video recorder (with Easylink Plus) connected to SCART2 otherwise the 'RECORD' function will not be highlighted. The connection is via pin 10 from SCART. This means that it has to be a full SCART or at least pin 10 has to be wired.

In order to be able to realise NexTView, two teletext type data flows, Data stream 1 and 2, are transmitted with various sub-code pages of information. This data flow can transport limited information (max. 40 pages). Data stream 1 is quick repeating with a repetition time of approximately 20 to 30 seconds. However, Data stream 2 has a much longer repetition time of approximately half an hour and has a large transport capacity.

- Data stream 1 contains information of the station that is being viewed.
- Data stream 2 contains up to one week of advance information from various stations that are covered by the provider.

9.1.14 CRT / SCAVEM / Rotation (diagram F)

RGB amplifiers

On the CRT panel, the RGB amplifier (TDA6108, IC7307) is located. Via the outputs 9, 8 and 7 the cathodes of the picture tube are driven.
The supply voltage for the amplifier is 180 V and is derived from the LOT.

SCAVEM

The SCAVEM-circuitry is implemented in the layout of the picture tube panel. It is thus not an extra module. SCAVEM means SCAn VElocity Modulation. This means that the horizontal deflection is influenced by the picture content. In an ideal square wave, the sides are limited in slope by a limited bandwidth (5 MHz).
SCAVEM will improve the slope as follows: At a positive slope, a SCAVEM-current is generated which supports the deflection current. The first half of the slope the spot is accelerated and the picture is darker, while at the second half of the slope, the spot is delayed and the slope becomes steeper.
At the end of the slope, the SCAVEM-current decays to zero and the spot is at the original position. An overshoot occurs which improves the impression of sharpness. At the negative slope, the SCAVEM-current counteracts the deflection.
During the first half of the slope, the spot is delayed, the slope becomes steeper.
During the second half the spot accelerates, the SCAVEM-current is zero at the end of the slope.

Via the three resistors R33315, R33317 and R3320, Red, Green and Blue are added together and offered to the emitter TS7300. On the collector of this transistor, configured in a common base, the sum of these 3 signals is obtained. Via the emitter follower formed with TS7301, this signal is conveyed to the differentiator C2303, R3309 and R3318. Only the high frequencies are differentiated (small RC-time).
The positive and negative pulses of this signal drive respectively TS7303 and TS7302 into conductivity. The DC setting of the output stage is set by R3304, R3308, R3316 and R3319. The working voltage of the transistors is settled at half the supply voltage.
At the positive section of the pulse, the current flows through R3318, C2307, the SCAVEM-coil and TS7303. At the negative section of the pulse, the current flows through R3318, C2409, the SCAVEM-coil and TS7302.

Rotation

In sets with a rotation coil (widescreen sets ≥ 32"), the amount of frame rotation is adjusted with the DAC-output of the HOP (see also 'Vertical Deflection').

9.1.15 Software related features

Following features are described:

- Smart Local Doming Prevention (SLDP)
- Auto TV
- Switch ON behaviour

Smart Local Doming Prevention (SLDP)

A CRT with an iron shadow mask shows a considerable amount of local doming (due to local heating), resulting in unwanted colour artefacts.
SLDP helps to reduce these artefacts for both 16:9 and 4:3 sets to an acceptable level. It measures the beam current in areas that are sensitive to local doming and reduces the contrast if the beam current in these places exceeds a pre-set threshold.
The chosen solution in EM2E, is based on the PICNIC hardware and software and it uses the histogram measurement of the PICNIC to make a prediction of the local heating of the CRT shadow mask.

With SLDP, local doming is diminished to an acceptable level at the cost of contrast reduction. By using a 'smart' solution for a part of the necessary contrast reduction, the resulting picture remains even more acceptable.
SLDP is not a feature. It's an algorithm that diminishes local doming effects. These effects occur whenever iron mask (and in a limited way invar mask) tubes are applied. Therefore, there is no reason to make it switchable for the customer. However, SLDP can be switched off via the Service Alignment Mode (SAM).

AutoTV

The AutoTV (or 'Automatic Picture Control' or 'Active Control') aims at giving the customer the best possible picture performance at any time. Therefor it does real time processing of the video signal and as a result, it decides to adapt several video parameters throughout the whole chassis.

The AutoTV feature integrates traditional picture performance, AutoTV functionality and 'smart controls' in order to come to a kind of 'supersmart' TV. It can be subdivided in:

- Auto Noise Reduction. This algorithm measures the amount of noise in the incoming video signal (this is done by the LIMERIC part of the PICNIC). As a result of this measurement, the amount of noise in the picture is corrected, starting from that noise level which is annoying for the customer. Which parameters exactly can be used is depending on the hardware.
- Auto Sharpness. This algorithm measures the amount of sharpness via the bandwidth of the incoming video signal and adapts the peaking frequency in the PICNIC according to this info. If the 'sharpness meter' sees the video content as 'sharp', high frequency peaking will be used. On the other hand, if the picture content is seen as 'not sharp', a low/mid frequency peaking is used. There is a coupling between the Auto Noise and the Auto Sharpness algorithm: if noise is present in the video content, then in general the sharpness will be made less aggressive. Special care has to be taken to the interaction of the LIMERIC and the vertical peaking of the PICNIC: a too big amount of vertical peaking increases the visibility of the 2DNR artefacts.

In the EM2E a limited AutoTV control function is used: only a combination of above described features is used in the background in order to improve the set performance, specially focussed on noise reduction.

Switch ON behaviour

First of all, the microprocessor needs to start up: After the power is applied, the 'Standby supply' starts oscillating, generating the +5V2 and +3V3. When ready, a reset (POR) is generated and the OTC is awakened.

During reset, the OTC puts a high level on all his outputs, causing the degaussing relay to close. After the reset, the outputs and inputs of the OTC must be initialised to their default state. The degaussing output of the OTC must stay high for 12 seconds.

Next step is the check whether the set needs to be in Standby or not. Therefore, the NVM content is read and the Standby-bit is checked. If the set is to stay in Standby, there is no further action.

If the set has to be switched 'on', the Standby-info line is pulled low. This results in the low power mode start-up of the HOP. The line drive starts to run on 50 kHz, wakes up the main supply and the +5 V, +8 V and +141 V supplies become available. The OTC waits until the +8 V is fully present. This is done by checking the ADC input of the OTC. A positive result means three times a positive +8 V detection in a row (time between each polling approx. 5 ms). If this detection still fails after 1 second, an error should be generated and the set must be switched to protection (error: "+8 V).

After detection of the +8 V, the MSP must be reset, since it can disturb I^2C traffic when not properly reset. From this moment on, I^2C traffic is possible.

To be sure that the HOP is properly started up, the POR bit of the HOP should be read. If this is not successful, the Standby info has to be put high again and an error code (code 11: HOP) will be generated. If the reading of the POR bit is successful, the starting procedure can be continued.

The Standby info line must be switched high again. The sync mode and the black current stabilisation loop of the HOP must be disabled in order to have a smooth start-up. Within 23.5 ms after reading the HOP POR bit, the HOP has to be started up via the HOP_start commando. If this condition is not fulfilled, the HOP will stop his line drive again and the set will not be able to start up.

During start-up of the deflection, I^2C traffic must be disabled for 250 ms to avoid data corruption. If flashes or spikes are generated during EHT start-up, I^2C data could be disturbed or corrupted.

After deflection is powered up completely, all protection algorithms are set active.
The rest of the NVM content can now be read and the IC's can be initialised according this info.

If SLDP is present in the set, an initialisation of SLDP has to be performed, including a calibration of the beamcurrent ADC.

The sync-mode of the HOP must be switched to active and the black current stabilisation loop in the HOP is switched on. Some extra checking is done to ensure that the loops are completely stabilised. Software sets all the necessary parameters for a correct sound and image and unblanks the picture.

A provision is foreseen to avoid sets in the field that will never unblank, if the picture tube is severely worn out. If the black current stabilisation does not become stable within a time frame of 30 seconds, the picture is unblanked anyway

9.2 Abbreviation list

AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeping up the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the featurebox
AI	Artificial Intelligence
AM	Amplitude Modulation
ANR	Automatic Noise Reduction: one of the algorithms of Auto TV
AR	Aspect Ratio: 4 by 3 or 16 by 9
Artistic	see OTC 2.5: main processor
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars but without throwing away video information
ATV	See Auto TV
AUDIO_C	Audio Centre
AUDIO_L	Audio Left
AUDIO_R	Audio Right
AUDIO_SL	Audio Surround Left
AUDIO_SW	Audio Subwoofer
AUDIO-L-PROC	Audio left processed
AUDIO-R-PROC	Audio right processed
AUDIO-SR	Audio surround right
Auto TV	Name for the combination of picture features/improvements which work automatically (ANR / Auto sharpness/ Auto Histo/ambient light).
BC-PROT	Beam current protection
BG	System B and G
BLC-INFO	Black current information
B-SC1-IN	Blue SCART1 in
B-SC2-IN	Blue SCART2 in
B-TXT	Blue teletext
CENTER	Centre speaker
C-FRONT	Chrominance front input
CL	Constant Level: audio output to connect with an external amplifier
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Colour Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronisation
CVBS-SC1-IN	CVBS SCART1 in
CVBS-SC2 OUT	CVBS SCART2 out
CVBS-SC2-IN	CVBS SCART2 in
CVBS-SC3-IN	CVBS SCART3 in
CVBS-SC4-IN	CVBS SCART4 IN
CVBS-TER	CVBS terrestrial
CVBS-TXT-DS-OUT	CBVBS teletext Dual Screen out
CVBS-TXT-OUT	CVBS teletext out
CVBS-Y-FRONT	CVBS luminance front input
DAC-HOP	Digital analogue converter HOP IC
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DC-filament	Filament supply voltage
DC-PROT	DC protection
DFU	Direction For Use: description for the end user
DNR	Digital Noise Reduction: noise reduction feature of the box
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
DYN-FASE-COR	Dynamic phase correction
EHT	Extra High Tension
EHT-INFO	Extra High Tension information
ELDP	Electrical Local Doming Prevention (only HW)
EPG	Electronic Program Guide: system used by broadcasters to transmit TV guide information (= NexTView)
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or via cinches
FBL	Fast Blanking: DC signal accompanying RGB signals
FBL-SC1-IN	Fast blanking signal for SCART1 in
FBL-SC2-IN	Fast blanking signal for SCART2 in
FBL-TXT	Fast Blanking Teletext
FBX	Feature Box: part of small signal / separate module which contains 100 Hz processing, extra featuring and AutoTV algorithms
FEAT-U	U from Feature Box
FEAT-V	V from Feature Box
FEAT-Y	Y from Feature Box
FILAMENT	Filament of CRT
FLASH	Flash memory
FM	Field Memory or Frequency Modulation
FMS	Functional Module Specification: document that describes an isolated hardware function
FRONT-C	Front input chrominance (SVHS)
FRONT-DETECT	Front input detection
FRONT-Y_CVBS	Front input luminance or CVBS (SVHS)
FRS	Functional Requirement Specification: software specification document
G-SC1-IN	Green SCART1 in
G-SC2-IN	Green SCART2 in
G-TXT	Green teletext
HA	Horizontal Acquisition: horizontal sync pulse coming out of the HIP
HD100	Horizontal Drive: horizontal sync pulse coming out of the featurebox
HDTV	High Definition TV: highest resolution defined by the ATSC standard (1080 lines and 1920 horizontal pixels, referred to as 1080i) The second HDTV standard, 720p x 1280 is not used in EM2E chassis (3fH standard not feasible)
Headroom	Extra margin provision to avoid clipping of signals
HEATER	Heater (Filament)
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
HFB+13V	Non rectified output 13V-winding LOT
HIP	High-end video Input Processor: video and chroma decoder of EM2E
HOP	High-end video Output Processor: video, sync and geometry controller of EM2E
HP	Headphone
HSI	Hardware Software Interface

IN-FRONT-SNDL	Sound left front in
IN-FRONT-SNDR	Sound right front in
IN-SC1-B	In SCART1 Blue
IN-SC1-G	In SCART1 Green
IN-SC1-R	In SCART1 Red
IN-SC1-SNDL	In SCART1 sound left
IN-SC1-SNDR	In SCART1 sound right
IN-SC2-B	In SCART2 Blue
IN-SC2-CVBS_Y	In SCART2 CVBS or luminance (SVHS)
IN-SC2-FBL	In SCART2 fast blanking
IN-SC2-G	In SCART2 Green
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
IO-BUS	In/Out - Bus
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according the customers wishes
LDP	Line Deflection Protection
LED	Light Emitting Diode
LINE-DRIVE	Line drive signal
LNA	Low Noise Adapter
LSP	Large signal panel
MSP	Multistandard Sound Processor: ITT sound decoder of EM2E
MUTE	Mute-Line
NC	Not Connected
NDF	No vertical DeFlection: vertical flyback protection
NHF	No Horizontal deflection: horizontal flyback protection
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
O/C	Open Circuit
ON/OFF LED	On/Off control signal for the LED
OSD	On Screen Display
OTC	On screen display Teletext and Control; also named Artistic (SAA5800)
P50	Project 50 communication: protocol between TV and peripherals
PCB	Printed Circuit board
PICNIC	Peripheral Integrated Combined Network IC: main IC for 100 Hz featuring and feature processing
PILOT	Pilot Signal
PILOTMUTE	Pilot Mute signal
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTP	Picture Tube Panel
RAM	Random Access Memory
RC	Remote Control
RC5	RC5 signal from the remote control receiver
RESET	Reset signal
ROM	Read Only Memory
SAM	Service Alignment Mode
SC	Sandcastle: pulse derived from sync signals
SCAVEM	Scan Velocity Modulation
S/C	Short Circuit
SC1-OUT	SCART output of the MSP audio IC
SC2-B-IN	Scart2 Blue in
SC2-C-IN	Scart2 chrominance in
SC2-OUT	SCART output of the MSP audio IC
SIF	Sound Intermediate Frequency
SIMM	80-fold connector between LSP and SSB
SLDP	Smart Local Dooming Prevention (HW and SW)
SNDL-SC1-IN	Sound left SCART1 in
SNDL-SC1-OUT	Sound left SCART1 out
SNDL-SC2-IN	Sound left SCART2 in
SNDL-SC2-OUT	Sound left SCART2 out
SNDR-SC1-IN	Sound right SCART1 in
SNDR-SC1-OUT	Sound right SCART1 out
SNDR-SC2-IN	Sound right SCART2 out
SNDR-SC2-OUT	Sound right SCART2 out
SNDS-VL-OUT	Surround sound left variable level out
SNDS-VR-OUT	Surround sound right variable level out
SNERT	Synchronous No parity Eight bit Reception and Transmit
SSB	Small Signal Board
STBY	Standby
SW	Subwoofer
TXT	Teletext
TXT DS	Teletext Dual Screen
µP	microprocessor
VA	Vertical Acquisition
V_{BAT}	main supply for deflection (mostly 141 V)
VD100	Vertical Drive: vertical sync pulse from deflection
VFB	Vertical Flyback Pulse: vertical sync pulse coming from the feature box
VL	Variable Level out: processed audio output towards external amplifier
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
Y-OUT	Luminance-signal to HOP IC

10. Spare parts list

Large Signal Panel [A]

Various

0010	2422 025 16374	2P Male
0020	4822 267 10774	2P Male
0032	4822 492 70788	IC-SPRING
0037	3104 304 21112	LOT SSB SUPPORT
0045	4822 267 10734	5P MALE
0065	3104 304 22031	LOT SPACER
0066	3104 304 21591	SCART SUPPORT BRACKET
0150	4822 265 11253	FUSE HOLDER
0153	4822 265 11253	FUSE HOLDER
0317	4822 265 20723	2P MALE
0324	3104 311 01881	CABLE 7P 480mm
0325	2422 025 16382	3P Male
0735	2422 025 16407	3P Male
0736	2422 025 16382	3P Male
0936	2422 025 12485	11P Male
0940	4822 267 10968	11P FEMALE
0943	4822 267 10748	3P MALE
0945	4822 267 10735	3P MALE
0946	5322 268 90415	2P MALE
0947	4822 267 10734	5P MALE
1001	4822 252 60151	SURGE PROTECT
1002	2422 132 07411	RELAY 1P 5V 5A
1003	4822 267 10973	1P
1200	4822 210 10848	UV1316/A I U-2
1205	2422 025 16599	80P Female SIMM
1501	4822 070 34002	FUSE 4A
1503	2422 086 10912	FUSE 2,5A
1901	4822 267 10771	IC SOCKET 42P
1902	4822 267 10982	2P
8000	4822 320 12525	CABLE
8001	4822 320 20234	EHT CABLE
8015	4822 320 20216	CABLE
	3122 785 100	Supply Kit Mains Supply EM2E
	3122 785 100	Supply Kit Standby Supply EM2E
	3122 785 100	Line Repair Kit EM2E

⊣⊢

2101	5322 122 32818	2.2nF 10% 100V
2102	4822 124 40248	10µF 20% 63V
2103	5322 122 32531	100pF 5% 50V
2104	4822 123 14025	2200µF 20% 16V
2105	5322 122 32531	100pF 5% 50V
2106	5322 126 10223	4.7nF 10% 63V
2107	5322 122 32818	2.2nF 10% 100V
2108	4822 121 70162	10nF 5% 400V
2109	4822 126 13482	470nF 80/20% 16V
2110	5322 121 42498	680nF 5% 63V
2111	4822 121 43526	47nF 5% 250V
2113	4822 122 33127	2.2nF 10% 63V
2114	4822 126 10206	2.2nF 10% 500V
2200	4822 124 40196	220µF 20% 16V
2201	4822 126 14076	220nF 25V
2202	4822 126 13473	220nF 80-20% 50V
2203	4822 124 41584	100µF 20% 10V
2400	4822 124 11575	47µF 20% 160V
2412	4822 126 13751	47nF 10% 63V
2413	4822 124 12255	10µF 20% 50V
2414	4822 126 13751	47nF 10% 63V
2415	4822 122 33575	220pF 5% 63V
2417	4822 126 14076	220nF 25V
2419	4822 126 14237	470pF 10% 2KV
2420	4822 121 70594	1nF 5% 2KV
2421	2022 333 00086	470nF 5% 250V
2421	4822 121 42634	560nF 5% 250V
2425	4822 121 10526	9N1 5% 2KV
2425	4822 121 70435	10nF 5% 2KV
2426	4822 121 10653	22nF 5% 630V
2426	4822 121 10658	24nF 5% 630V
2429	4822 121 43343	4.7nF 10% 400V
2430	4822 121 41857	10nF 5% 250V
2431	4822 121 42077	6.8nF 10% 400V
2431	4822 126 13599	3.3nF 10% 500V
2433	2022 333 00086	470nF 5% 250V
2433	4822 121 42634	560nF 5% 250V
2435	4822 121 10526	9N1 5% 2KV
2450	5322 121 42578	100nF 5% 250V
2455	5322 126 10511	1nF 5% 50V
2460	4822 124 40784	3300µF 20% 16V
2461	4822 122 31177	470pF 10% 500V
2462	4822 124 80061	1000µF 20% 25V
2463	4822 122 31177	470pF 10% 500V
2464	4822 124 80061	1000µF 20% 25V
2465	4822 122 31177	470pF 10% 500V
2468	4822 124 12297	4.7µF 20% 350V
2469	4822 122 31177	470pF 10% 500V
2480	4822 121 51442	2.2nF 10% 50V
2489	4822 124 40433	47µF 20% 25V
2490	4822 122 33891	3.3nF 10% 63V
2491	4822 124 40768	0.47µF 20% 100V
2492	4822 126 14076	220nF 25V
2495	4822 126 13838	100nF 20% 50V
2499	4822 126 13838	100nF 20% 50V
2501	4822 126 11524	1.5nF 10% 1KV
2502	5322 122 32818	2.2nF 10% 100V
2503	5322 121 42489	33nF 5% 250V
2505	4822 126 14504	3.3nF 20% 250V
2507	4822 126 13589	470nF 275V
2508	4822 126 14153	2.2nF 10%B 1KV
2509	4822 126 14153	2.2nF 10%B 1KV
2510	4822 124 12415	220µF 20% 400V
2512	4822 124 12056	1000µF 20% 35V
2513	5322 122 34099	470pF 10% 63V
2514	5322 122 31863	63V 330pF 5%
2515	4822 124 11575	47µF 20% 160V
2518	4822 126 11308	47pF 5% 500V
2519	5322 122 32818	2.2nF 10% 100V
2520	4822 126 14585	100nF 10% 50V
2521	4822 122 33216	270pF 5% 50V
2528	4822 126 14585	100nF 10% 50V
2530	4822 126 14585	100nF 10% 50V
2531	4822 122 31169	1.5nF 10% 500V
2535	4822 121 43913	470nF 10% 100V
2536	4822 126 10206	2.2nF 10% 500V
2537	4822 124 11913	22nF 20% 275V
2538	5322 126 10223	4.7nF 10% 63V
2600	4822 121 43913	470nF 10% 100V
2601	4822 121 51252	470nF 5% 63V
2602	4822 124 40433	47µF 20% 25V
2603	4822 122 33177	10nF 20% 50V
2604	4822 124 40248	10µF 20% 63V
2610	4822 122 33127	2.2nF 10% 63V
2620	4822 126 14076	220nF 25V
2621	4822 126 13838	100nF 20% 50V
2622	4822 124 40255	100µF 20% 63V
2624	4822 121 51252	470nF 5% 63V
2625	4822 121 51252	470nF 5% 63V
2627	5322 124 40641	10µF 20% 100V
2642	4822 124 40255	100µF 20% 63V
2700	4822 124 21913	1µF 20% 63V
2701	4822 124 21913	1µF 20% 63V
2730	4822 124 81151	22µF 50V
2731	4822 124 81151	22µF 50V
2732	4822 124 40255	100µF 20% 63V
2733	4822 124 40255	100µF 20% 63V
2734	4822 124 81151	22µF 50V
2735	4822 124 81151	22µF 50V
2736	5322 122 31865	1.5nF 10% 63V
2737	5322 122 31865	1.5nF 10% 63V
2756	4822 126 13751	47nF 10% 63V
2760	4822 124 80061	1000µF 20% 25V
2761	4822 124 80061	1000µF 20% 25V
2765	4822 124 40255	100µF 20% 63V
2767	4822 124 40255	100µF 20% 63V
2782	4822 126 13751	47nF 10% 63V
2902	5322 122 31863	330pF 5% 63V
2903	5322 122 31863	330pF 5% 63V
2906	5322 122 32531	100pF 5% 50V
2909	5322 122 31863	330pF 5% 63V
2910	5322 122 32531	100pF 5% 50V
2912	4822 124 40248	10µF 20% 63V
2913	4822 126 14585	100nF 10% 50V
2915	5322 122 31863	330pF 5% 63V
2916	5322 122 31863	330pF 5% 63V
2917	5322 122 32531	100pF 5% 50V
2919	5322 122 31863	330pF 5% 63V
2920	5322 122 32531	100pF 5% 50V
2923	5322 122 31863	330pF 5% 63V
2925	5322 122 31863	330pF 5% 63V
2926	4822 124 81044	470µF 20% 6.3V
2927	4822 124 40433	47µF 20% 25V
2941	5322 122 31865	1.5nF 10% 63V
2942	5322 122 31865	1.5nF 10% 63V
2951	4822 124 21913	1µF 20% 63V
2952	4822 126 13751	47nF 10% 63V
2953	4822 126 13751	47nF 10% 63V

─▭─

3101	4822 053 20106	10M 5% 0.25W
3102	4822 050 26801	680Ω 1% 0.6W
3103	4822 050 26801	680Ω 1% 0.6W
3104	4822 116 52195	47Ω 5% 0.5W
3105	4822 050 26801	680Ω 1% 0.6W
3106	4822 116 52256	2k2 5% 0.5W
3107	4822 116 52256	2k2 5% 0.5W
3108	4822 116 52182	15Ω 5% 0.5W
3110	4822 052 10109	10Ω 5% 0.33W
3113	4822 116 52182	15Ω 5% 0.5W
3114	4822 116 83872	220Ω 5% 0.5W
3117	4822 116 52195	47Ω 5% 0.5W
3118	4822 050 24708	4Ω7 1% 0.6W
3120	4822 051 20109	10Ω 5% 0.1W
3123	4822 116 52176	10Ω 5% 0.5W
3124	4822 116 52199	68Ω 5% 0.5W
3125	4822 116 52182	15Ω 5% 0.5W
3126	4822 050 21003	10k 1% 0.6W
3127	4822 116 52289	5k6 5% 0.5W
3200	4822 051 20101	100Ω 5% 0.1W
3201	4822 051 20101	100Ω 5% 0.1W
3250	4822 051 20223	22k 5% 0.1W
3402	4822 117 10837	100k 1% 0.1W
3403	4822 051 20101	100Ω 5% 0.1W
3404	4822 051 20471	470Ω 5% 0.1W
3406	4822 051 20101	100Ω 5% 0.1W
3407	4822 117 10833	10k 1% 0.1W
3410	4822 051 20479	47Ω 5% 0.1W
3411	4822 116 52193	39Ω 5% 0.5W
3414	4822 117 13577	330Ω 1% 1.25W
3415	3198 012 31590	15Ω 5% 3W
3415	4822 117 12836	12Ω 5% 3W
3417	4822 116 52176	10Ω 5% 0.5W
3418	4822 050 22704	270k 1% 0.6W
3431	4822 052 10101	100Ω 5% 0.33W
3431	4822 052 10221	220Ω 5% 0.33W
3450	4822 116 52303	8k2 5% 0.5W
3450	4822 116 83961	6k8 5%
3451	4822 116 52257	22k 5% 0.5W
3460	4822 052 10108	1Ω 5% 0.33W
3461	4822 052 10108	1Ω 5% 0.33W
3462	4822 052 10108	1Ω 5% 0.33W
3463	4822 052 10108	1Ω 5% 0.33W
3464	4822 052 10108	1Ω 5% 0.33W
3465	4822 052 10108	1Ω 5% 0.33W
3466	4822 052 10688	6Ω8 5% 0.33W
3466	4822 052 10828	8Ω2 5% 0.33W
3467	4822 052 10108	1Ω 5% 0.33W
3468	4822 052 11688	6Ω8 5% 0.5W
3475	4822 116 52175	100Ω 5% 0.5W
3481	4822 116 52175	100Ω 5% 0.5W
3483	4822 051 10102	1k 2% 0.25W
3484	4822 117 11139	1k5 1% 0.1W
3485	4822 117 11454	820Ω 1% 0.1W
3486	4822 117 12955	2k7 1% 0.1W
3487	4822 117 11449	2k2 1% 0.1W
3488	4822 116 52272	330k 5% 0.5W
3488	4822 116 83874	220k 5% 0.5W
3489	4822 117 11449	2k2 1% 0.1W
3491	4822 050 21504	150k 1% 0.6W
3495	4822 051 20683	68k 5% 0.1W
3496	4822 117 11507	6k8 1% 0.1W
3497	4822 117 10834	47k 1% 0.1W
3498	4822 051 20472	4k7 5% 0.1W
3499	4822 117 10837	100k 1% 0.1W
3500	4822 117 12074	1Ω5 10% 7W
3501	3198 013 04710	470Ω 2% 1/2W
3504	4822 116 83883	470Ω 5% 0.5W
3507	4822 050 21604	160k 1% 0.6W
3508	3198 012 16820	6.8k 1W
3509	2322 595 90021	VDR DC 1M A/495V
3510	4822 117 11951	2k 1% 0.1W
3511	4822 116 52276	3k9 5% 0.5W
3512	4822 116 52297	68k 5% 0.5W
3513	4822 116 52272	330k 5% 0.5W
3514	4822 053 10108	1Ω 5% 1W
3515	4822 053 10108	1Ω 5% 1W
3516	4822 116 10075	9Ω 220V
3518	4822 050 11204	120k 1% 0.4W
3519	4822 051 20223	22k 5% 0.1W
3520	4822 053 11333	33k 5% 2W

3521	4822 117 10118	1M 5% 0.5W
3522	4822 116 83961	6k8 5%
3523	4822 051 20105	1M 5% 0.1W
3524	4822 051 10102	1k 2% 0.25W
3525	4822 051 20479	47Ω 5% 0.1W
3526	4822 116 83303	1Ω 2W
3527	4822 117 11454	820Ω 1% 0.1W
3528	4822 117 10833	10k 1% 0.1W
3529	4822 051 20472	4k7 5% 0.1W
3530	4822 116 52297	68k 5% 0.5W
3531	4822 117 10833	10k 1% 0.1W
3533	4822 051 20159	15Ω 5% 0.1W
3535	4822 051 20273	27k 5% 0.1W
3536	4822 117 10837	100k 1% 0.1W
3537	4822 117 10833	10k 1% 0.1W
3538	4822 051 20332	3k3 5% 0.1W
3539	4822 117 10833	10k 1% 0.1W
3540	4822 117 10834	47k 1% 0.1W
3541	4822 117 10833	10k 1% 0.1W
3542	3198 012 11570	0Ω15 5% 1W
3543	4822 051 20478	4Ω7 5% 0.1W
3544	4822 051 20479	47Ω 5% 0.1W
3600	4822 050 22205	2M2 1% 0.6W
3601	4822 050 22205	2M2 1% 0.6W
3602	4822 051 20332	3k3 5% 0.1W
3603	4822 101 11319	100Ω LIN
3605	4822 051 20273	27k 5% 0.1W
3606	4822 051 10102	1k 2% 0.25W
3607	4822 051 20223	22k 5% 0.1W
3608	4822 051 20223	22k 5% 0.1W
3609	4822 101 11193	47k 30% LIN 0.1W
3610	4822 051 20683	68k 5% 0.1W
3611	4822 051 20822	8k2 5% 0.1W
3612	4822 051 20274	270k 5% 0.1W
3613	4822 051 20274	270k 5% 0.1W
3614	4822 050 21005	1M 1% 0.6W
3615	4822 050 18204	820k 1% 0.4W
3615	4822 116 52292	560k 5% 0.5W
3616	4822 116 52285	470k 5% 0.5W
3617	4822 050 11002	1k 1% 0.4W
3618	4822 051 10102	1k 2% 0.25W
3619	4822 051 20562	5k6 5% 0.1W
3620	4822 116 80176	1Ω 5% 0.5W
3620	4822 116 80676	1Ω5 5% 0.5W
3621	4822 116 80176	1Ω 5% 0.5W
3622	4822 116 80176	1Ω 5% 0.5W
3623	4822 117 10834	47k 1% 0.1W
3624	4822 052 10158	1Ω5 5% 0.33W
3625	4822 116 83872	220Ω 5% 0.5W
3626	4822 116 83872	220Ω 5% 0.5W
3627	4822 050 21003	10k 1% 0.6W
3630	4822 051 10102	1k 2% 0.25W
3631	4822 051 20332	3k3 5% 0.1W
3632	4822 117 10833	10k 1% 0.1W
3633	4822 050 21003	10k 1% 0.6W
3644	4822 117 10833	10k 1% 0.1W
3645	4822 116 52245	150k 5% 0.5W
3652	4822 051 20101	100Ω 5% 0.1W
3701	4822 117 10833	10k 1% 0.1W
3702	4822 117 10833	10k 1% 0.1W
3730	4822 117 10833	10k 1% 0.1W
3731	4822 117 10833	10k 1% 0.1W
3732	4822 051 20822	8k2 5% 0.1W
3733	4822 051 20822	8k2 5% 0.1W
3734	4822 117 10834	47k 1% 0.1W
3735	4822 117 10834	47k 1% 0.1W
3736	4822 051 10102	1k 2% 0.25W
3737	4822 051 10102	1k 2% 0.25W
3738	4822 117 11148	56k 1% 0.1W
3739	4822 117 11148	56k 1% 0.1W
3740	4822 051 20683	68k 5% 0.1W
3741	4822 051 20683	68k 5% 0.1W
3742	4822 116 52199	68Ω 5% 0.5W
3743	4822 116 52199	68Ω 5% 0.5W
3756	4822 117 10833	10k 1% 0.1W
3762	4822 051 20828	8Ω2 5% 0.1W
3765	4822 117 11507	6k8 1% 0.1W
3770	4822 117 10834	47k 1% 0.1W
3771	4822 116 83933	15k 1% 0.1W
3773	4822 116 83933	15k 1% 0.1W
3789	4822 051 20828	8Ω2 5% 0.1W
3790	4822 051 10102	1k 2% 0.25W
3792	4822 051 10102	1k 2% 0.25W
3900	4822 116 83868	150Ω 5% 0.5W
3901	4822 117 10353	150Ω 1% 0.1W
3902	4822 117 10353	150Ω 1% 0.1W
3903	4822 117 10353	150Ω 1% 0.1W
3905	4822 116 83883	470Ω 5% 0.5W
3906	4822 116 52201	75Ω 5% 0.5W
3907	4822 051 20561	560Ω 5% 0.1W
3908	4822 116 52201	75Ω 5% 0.5W
3909	4822 116 52201	75Ω 5% 0.5W
3910	4822 116 52201	75Ω 5% 0.5W
3911	4822 116 52201	75Ω 5% 0.5W
3913	4822 116 52201	75Ω 5% 0.5W
3915	4822 116 52201	75Ω 5% 0.5W
3916	4822 051 20822	8k2 5% 0.1W
3918	4822 051 20392	3k9 5% 0.1W
3919	4822 051 10102	1k 2% 0.25W
3920	4822 051 10102	1k 2% 0.25W
3921	4822 117 10353	150Ω 1% 0.1W
3922	4822 117 10353	150Ω 1% 0.1W
3923	4822 117 10353	150Ω 1% 0.1W
3924	4822 117 10353	150Ω 1% 0.1W
3925	4822 052 10688	6Ω8 5% 0.33W
3928	4822 051 20101	100Ω 5% 0.1W
3929	4822 117 10833	10k 1% 0.1W
3930	4822 051 20561	560Ω 5% 0.1W
3932	4822 116 52201	75Ω 5% 0.5W
3935	4822 116 52201	75Ω 5% 0.5W
3936	4822 117 10353	150Ω 1% 0.1W
3937	4822 117 10353	150Ω 1% 0.1W
3940	4822 117 10353	150Ω 1% 0.1W
3941	4822 117 10353	150Ω 1% 0.1W
3942	4822 051 20822	8k2 5% 0.1W
3944	4822 051 10102	1k 2% 0.25W
3945	4822 051 20392	3k9 5% 0.1W
3946	4822 051 10102	1k 2% 0.25W
3970	4822 051 20471	470Ω 5% 0.1W
3971	4822 117 10833	10k 1% 0.1W
3972	4822 117 10833	10k 1% 0.1W
3991	4822 116 52175	100Ω 5% 0.5W
3992	4822 051 20101	100Ω 5% 0.1W
3993	4822 051 20101	100Ω 5% 0.1W
3994	4822 116 52175	100Ω 5% 0.5W
3995	4822 116 52175	100Ω 5% 0.5W
3996	4822 116 52175	100Ω 5% 0.5W
3997	4822 116 52175	100Ω 5% 0.5W
3998	4822 116 52175	100Ω 5% 0.5W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W
9220	4822 051 20008	JUMPER
9225	4822 051 20008	JUMPER
9723	4822 051 20008	JUMPER
9724	4822 051 20008	JUMPER

∿

5101	4822 146 11065	STANDBY TFM
5102	4822 157 70436	8.2µH
5103	4822 526 10704	BEAD 50MHz
5104	4822 157 11411	BEAD 100MHz
5105	4822 526 10704	BEAD 100MHz
5200	4822 157 11775	6.8µH 5%
5400	4822 157 11869	33µH 10%
5410	4822 146 11065	TFM SIG FIX
5411	4822 157 71097	0.56µH
5421	4822 157 11204	COIL LINE CORR.(29")
5421	4822 157 11839	COIL LINE CORR. (28")
5421	4822 157 11841	COIL LINE CORR. (28"WS,32"WS)
5422	4822 157 71535	COIL BRIDGE
5424	4822 157 63255	COIL BRIDGE
5430	8204 000 73321	LOT (29")
5430	8228 001 33243	LOT (25",28")
5461	4822 157 11411	BEAD 100MHz
5463	4822 157 11411	BEAD 100MHz
5465	4822 157 11411	BEAD 100MHz
5466	4822 157 71467	39U 10%
5467	4822 157 11411	BEAD 100MHz
5504	2422 549 43286	MAINS 35mH 1A5
5505	4822 157 11411	BEAD 100MHz
5506	2422 531 98042	TFM W8085-002 Y
5510	4822 157 11411	BEAD 100MHz
5620	4822 157 11771	0.09µH 10%

⊳|

6103	4822 130 42488	BYD33D
6105	4822 130 34281	BZX79-B15
6106	4822 130 34499	BZX79-B20
6108	4822 130 30621	1N4148
6109	4822 130 31083	BYW55
6111	4822 130 32715	SB340
6120	4822 130 30621	1N4148
6121	4822 130 30621	1N4148
6122	3198 010 53980	BZX79-B3V9
6200	9322 149 10685	BZM55-C33
6201	4822 130 83757	BAS216
6202	4822 130 83757	BAS216
6203	4822 130 10852	BZX284-C6V8
6204	4822 130 10852	BZX284-C6V8
6205	4822 130 83757	BAS216
6405	4822 130 11027	BZX284-C33
6406	4822 130 83757	BAS216
6407	4822 130 83757	BAS216
6408	4822 130 42488	BYD33D
6421	4822 130 10753	BY359X-1500
6422	4822 130 10218	BY229X-800
6442	9322 129 42685	BZM55-C15
6461	4822 130 82512	BYV29F-400
6462	4822 130 41487	BYV95C
6464	5322 130 31938	BYV27-200
6468	4822 130 42488	BYD33D
6480	4822 130 42488	BYD33D
6481	4822 130 31024	BZX79-B18
6482	4822 130 83757	BAS216
6499	4822 130 83757	BAS216
6501	4822 130 31083	BYW55
6502	4822 130 31083	BYW55
6503	4822 130 31083	BYW55
6504	4822 130 31083	BYW55
6505	4822 130 34281	BZX79-B15
6506	4822 130 30621	1N4148
6507	4822 130 80791	BYV28-200/20
6508	4822 130 11415	BYV28-400/20
6510	4822 130 34281	BZX79-B15
6511	4822 130 83757	BAS216
6512	4822 130 83757	BAS216
6514	5322 130 31932	BZT03-C200
6515	4822 130 32904	BZV85-C5V6
6516	4822 130 83757	BAS216
6517	4822 130 31983	BAT85
6518	4822 130 83757	BAS216
6520	4822 130 42488	BYD33D
6521	4822 130 83757	BAS216
6522	4822 130 83757	BAS216
6600	4822 130 31983	BAT85
6616	4822 130 83757	BAS216
6619	4822 130 42488	BYD33D
6620	5322 130 31938	BYV27-200
6621	4822 130 42488	BYD33D
6622	5322 130 33635	BZV85-C8V2
6623	4822 130 83757	BAS216

⊗ ▭

7100	4822 130 44568	BC557B
7101	4822 130 40959	BC547B
7102	4822 130 11417	STP3NB60FP
7104	4822 130 11418	TCDT1102G
7407	4822 130 60511	BC847B
7408	9332 592 40126	BC368
7409	4822 130 60511	BC847B
7421	4822 130 63666	BU2520DF
7480	4822 130 11417	STP3NB60FP
7481	4822 130 44568	BC557B
7482	4822 130 11418	TCDT1102G
7499	4822 130 60373	BC856B
7502	4822 130 61675	BF487
7504	9322 126 65687	STP5NB60FP
7505	4822 130 60373	BC856B
7506	4822 209 81397	TL431CLPST
7510	4822 130 60511	BC847B
7511	4822 130 60373	BC856B
7528	4822 130 40981	BC337-25
7529	4822 130 60511	BC847B
7600	4822 130 44461	BC546B
7602	4822 130 60511	BC847B
7603	4822 130 60373	BC856B
7605	4822 130 60511	BC847B
7606	4822 130 60511	BC847B
7610	4822 130 11418	TCDT1102G
7620	4822 209 90009	TDA8177
7641	4822 130 60511	BC847B
7652	4822 130 60511	BC847B
7720	4822 130 60511	BC847B
7721	4822 130 60511	BC847B
7722	4822 130 60373	BC856B
7723	4822 130 60373	BC856B
7724	4822 130 60511	BC847B
7725	4822 130 60511	BC847B
7730	4822 130 60511	BC847B
7750	4822 209 32269	TDA2616/N1
7900	4822 130 40959	BC547B
7901	4822 130 40959	BC547B
7905	9332 592 40126	BC368
7906	4822 209 12334	L4940V85
7907	4822 130 60511	BC847B

Small Signal Panel [B]

Various

1001	2422 543 89022	RES XTL 6M000
1301	2422 540 98456	RES 12MHz
1305	2422 543 01092	RES XTL 4M433619
1308	2422 543 01097	RES XTL 3M579545
1405	2422 549 44369	FIL SAW 38MHz
1407	2422 549 44324	FIL TPWCC04BS
1408	2422 549 44372	FIL SAW 38MHz
1409	2422 025 16542	2P MALE
1651	2422 543 89019	RES XTL 8M432
1701	2422 543 89018	RES XTL 12MHz

⊣⊢

2001	4822 126 11671	33pF
2002	4822 126 11669	27pF
2003	4822 126 13879	220nF 20% 16V
2004	4822 126 13879	220nF 20% 16V
2005	4822 126 14305	100nF 10% 16V
2006	4822 126 14305	100nF 10% 16V
2007	4822 126 14305	100nF 10% 16V
2008	4822 126 14305	100nF 10% 16V
2009	4822 122 33777	47pF 5% 63V
2010	4822 122 33777	47pF 5% 63V
2011	4822 122 33777	47pF 5% 63V
2012	4822 122 33777	47pF 5% 63V
2013	4822 124 12095	100µF 20% 16V
2014	4822 126 14305	100nF 10% 16V
2015	4822 126 14305	100nF 10% 16V
2016	4822 124 12095	100µF 20% 16V
2017	4822 126 14305	100nF 10% 16V
2019	4822 126 14305	100nF 10% 16V
2020	4822 126 13883	220pF 5% 50V
2022	4822 126 14305	100nF 10% 16V
2023	4822 126 14305	100nF 10% 16V
2024	4822 126 14305	100nF 10% 16V
2025	4822 126 14305	100nF 10% 16V
2026	4822 126 14305	100nF 10% 16V
2027	4822 126 14305	100nF 10% 16V
2028	4822 126 14305	100nF 10% 16V
2029	4822 126 14305	100nF 10% 16V
2031	4822 126 14305	100nF 10% 16V
2032	4822 126 14305	100nF 10% 16V
2033	4822 126 14226	82pF 5% 50V
2034	4822 126 14226	82pF 5% 50V
2035	4822 126 14226	82pF 5% 50V
2036	4822 126 14226	82pF 5% 50V
2037	4822 126 14226	82pF 5% 50V
2038	4822 126 14305	100nF 10% 16V
2300	4822 124 12095	100µF 20% 16V
2303	5322 126 11583	10nF 10% 50V
2304	4822 122 33741	10pF 10% 50V
2306	4822 126 13881	470pF 5% 50V
2307	4822 126 14305	100nF 10% 16V
2308	4822 122 33741	10pF 10% 50V
2313	4822 121 70159	0.1µF 16V
2314	4822 124 12095	100µF 20% 16V
2315	4822 126 14305	100nF 10% 16V
2317	4822 126 14491	2.2µF 10V
2318	4822 126 14494	22nF 10% 25V
2319	5322 126 11583	10nF 10% 50V
2320	4822 122 33741	10pF 10% 50V
2321	4822 126 14305	100nF 10% 16V
2322	4822 126 14305	100nF 10% 16V
2323	4822 126 14305	100nF 10% 16V
2324	5322 126 11583	10nF 10% 50V
2325	4822 126 14305	100nF 10% 16V
2328	4822 122 33761	22pF 5% 50V
2329	4822 126 14305	100nF 10% 16V
2330	4822 126 14305	100nF 10% 16V
2331	4822 126 14305	100nF 10% 16V
2332	4822 126 14305	100nF 10% 16V
2333	4822 126 14491	2.2µF 10V
2334	4822 126 14491	2.2µF 10V
2335	4822 124 80349	47µF 20% 6.3V
2336	4822 126 14491	2.2µF 10V
2338	5322 126 11583	10nF 10% 50V
2340	4822 124 23002	10µF 16V
2341	4822 124 12095	100µF 20% 16V
2350	4822 126 14305	100nF 10% 16V
2351	4822 126 14305	100nF 10% 16V
2352	4822 126 14305	100nF 10% 16V
2356	4822 126 14305	100nF 10% 16V
2357	4822 126 14305	100nF 10% 16V
2358	5322 126 11579	3.3nF 10% 63V
2359	4822 122 33752	15pF 5% 50V
2361	3198 016 31580	1P5 50V
2362	4822 126 11663	12pF
2365	4822 126 14305	100nF 10% 16V
2366	4822 126 14305	100nF 10% 16V
2367	4822 126 14305	100nF 10% 16V
2368	4822 126 14305	100nF 10% 16V
2369	4822 126 14305	100nF 10% 16V
2370	4822 126 14305	100nF 10% 16V
2371	4822 126 13193	4.7nF 10% 63V
2372	4822 126 14043	1µF 20% 16V
2373	4822 126 14305	100nF 10% 16V
2374	4822 126 14491	2.2µF 10V
2375	4822 126 14494	22nF 10% 25V
2376	4822 126 14305	100nF 10% 16V
2377	4822 124 12095	100µF 20% 16V
2378	4822 126 14305	100nF 10% 16V
2384	4822 126 14305	100nF 10% 16V
2406	4822 126 13883	220pF 5% 50V
2407	4822 126 13956	68pF 5% 63V
2408	3198 016 32780	2P7 50V
2409	4822 126 14491	2.2µF 10V
2410	4822 126 14472	1µF 10% 10V
2411	4822 126 14305	100nF 10% 16V
2412	4822 126 13193	4.7nF 10% 63V
2413	4822 124 80151	47µF 16V
2417	3198 017 44740	470nF 10V
2418	4822 126 13956	68pF 5% 63V
2420	4822 122 33753	150pF 5% 50V
2501	4822 122 33777	47pF 5% 63V
2502	4822 122 32927	220nF 20% 50V
2503	4822 122 32927	220nF 20% 50V
2504	4822 122 32927	220nF 20% 50V
2505	4822 122 32927	220nF 20% 50V
2508	4822 124 12095	100µF 20% 16V
2546	4822 124 23002	10µF 16V
2547	4822 124 23002	10µF 16V
2548	4822 124 23002	10µF 16V
2549	4822 124 23002	10µF 16V
2550	4822 126 14241	330P 50V
2551	5322 126 11579	3.3nF 10% 63V
2609	3198 016 31020	0603 25V 1nF
2610	4822 126 14238	2N2 50V
2611	5322 126 11578	1nF 10% 50V
2629	4822 122 32927	220nF 20% 50V
2636	4822 122 32927	220nF 20% 50V
2637	4822 122 32927	220nF 20% 50V
2638	4822 122 32927	220nF 20% 50V
2640	4822 126 13879	220nF 20% 16V
2641	4822 122 32927	220nF 20% 50V
2642	4822 122 32927	220nF 20% 50V
2651	4822 126 14305	100nF 10% 16V
2652	4822 122 33777	47pF 5% 63V
2653	4822 122 32927	220nF 20% 50V
2654	4822 126 13881	470pF 5% 50V
2655	4822 126 13881	470pF 5% 50V
2656	4822 126 13881	470pF 5% 50V
2657	4822 126 13881	470pF 5% 50V
2658	4822 126 13881	470pF 5% 50V
2661	4822 122 32927	220nF 20% 50V
2662	4822 122 32927	220nF 20% 50V
2663	4822 126 13881	470pF 5% 50V
2664	4822 126 13881	470pF 5% 50V
2665	4822 124 12095	100µF 20% 16V
2666	4822 124 12095	100µF 20% 16V
2667	3198 016 33380	3P3 50V
2668	3198 016 33380	3P3 50V
2669	4822 124 23002	10µF 16V
2670	5322 126 11583	10nF 10% 50V
2673	3198 016 31020	1nF 25V
2674	3198 016 31020	1nF 25V
2675	4822 124 23002	10µF 16V
2677	3198 030 82280	2U2 20% 50V
2677	4822 124 23002	10µF 16V
2678	4822 124 23002	10µF 16V
2679	4822 126 14305	100nF 10% 16V
2680	4822 124 23002	10µF 16V
2681	4822 126 14305	100nF 10% 16V
2682	4822 124 23002	10µF 16V
2685	3198 016 31020	1nF 25V
2686	3198 016 31020	1nF 25V
2690	4822 126 14305	100nF 10% 16V
2691	4822 126 14305	100nF 10% 16V
2692	4822 126 14305	100nF 10% 16V
2693	4822 126 13883	220pF 5% 50V
2702	4822 124 23002	10µF 16V
2703	4822 126 14305	100nF 10% 16V
2704	4822 124 23002	10µF 16V
2706	4822 124 12095	100µF 20% 16V
2707	4822 126 14305	100nF 10% 16V
2708	4822 124 23002	10µF 16V
2709	4822 126 14305	100nF 10% 16V
2710	4822 124 23002	10µF 16V
2712	4822 124 23002	10µF 16V
2713	4822 126 14305	100nF 10% 16V
2717	4822 126 14218	3.9pF 50V
2718	4822 126 11669	27pF
2719	4822 126 11663	12pF
2720	4822 126 14218	3.9pF 50V
2721	4822 126 11669	27pF
2723	4822 126 11663	12pF
2724	4822 126 14218	3.9pF 50V
2725	4822 126 11669	27pF
2726	4822 126 11663	12pF
2728	4822 126 14305	100nF 10% 16V
2729	4822 126 14225	56pF 5% 50V
2730	4822 126 14494	22nF 10% 25V
2731	4822 122 31765	100pF 2% 63V
2733	4822 126 14494	22nF 10% 25V
2738	4822 126 14494	22nF 10% 25V
2743	4822 126 14494	22nF 10% 25V
2747	4822 126 14507	18pF 5% 50V
2748	4822 126 14507	18pF 5% 50V
2755	4822 126 14305	100nF 10% 16V
2756	4822 126 14305	100nF 10% 16V
2757	4822 124 23002	10µF 16V
2758	4822 126 14305	100nF 10% 16V
2759	4822 126 14305	100nF 10% 16V
2760	4822 126 14305	100nF 10% 16V
2761	4822 126 14305	100nF 10% 16V
2762	4822 126 14305	100nF 10% 16V
2763	4822 126 14305	100nF 10% 16V
2764	4822 126 14305	100nF 10% 16V
2765	4822 126 14305	100nF 10% 16V
2766	4822 126 14305	100nF 10% 16V
2767	4822 126 14305	100nF 10% 16V
2770	4822 126 14305	100nF 10% 16V
2771	4822 126 14305	100nF 10% 16V
2772	4822 126 14305	100nF 10% 16V
2773	4822 126 14305	100nF 10% 16V
2774	4822 126 14305	100nF 10% 16V
2776	4822 126 14305	100nF 10% 16V
2785	4822 126 14305	100nF 10% 16V
2786	4822 126 14305	100nF 10% 16V
2788	4822 126 14305	100nF 10% 16V
2790	4822 126 14305	100nF 10% 16V
2792	4822 126 14305	100nF 10% 16V
2795	4822 126 14305	100nF 10% 16V
2796	4822 126 14305	100nF 10% 16V
2797	4822 126 13956	68pF 5% 63V
2798	3198 016 36810	680P 25V
2902	5322 126 11583	10nF 10% 50V

-▭-

3001	4822 051 30472	4k7 5% 0.062W
3002	4822 051 30472	4k7 5% 0.062W
3003	4822 051 30223	22k 5% 0.062W
3006	4822 051 30471	470Ω 5% 0.062W
3007	4822 117 13521	470Ω 5% 0.63W
3008	4822 117 13526	150Ω 5% 0.63W
3009	4822 051 30689	68Ω 5% 0.063W
3011	4822 051 30471	470Ω 5% 0.062W
3012	4822 051 30471	470Ω 5% 0.062W
3013	4822 051 30103	10k 5% 0.062W
3014	4822 051 30682	6k8 5% 0.062W
3015	4822 051 30474	470k 5% 0.062W
3016	4822 051 30152	1k5 5% 0.062W
3017	4822 051 30472	4k7 5% 0.062W
3018	4822 051 30103	10k 5% 0.062W
3019	4822 051 30472	4k7 5% 0.062W
3020	4822 051 30103	10k 5% 0.062W
3021	4822 051 30103	10k 5% 0.062W
3023	4822 051 30471	470Ω 5% 0.062W
3024	4822 051 30273	27k 5% 0.062W
3025	4822 051 30221	220Ω 5% 0.062W
3026	4822 051 30103	10k 5% 0.062W
3027	4822 117 12925	47k 1% 0.063W
3028	4822 051 30471	470Ω 5% 0.062W
3029	4822 051 30103	10k 5% 0.062W
3030	4822 051 30103	10k 5% 0.062W
3031	4822 051 30103	10k 5% 0.062W
3032	4822 051 30471	470Ω 5% 0.062W
3033	4822 051 30103	10k 5% 0.062W
3034	4822 051 30101	100Ω 5% 0.062W
3035	4822 117 13522	100Ω 5% 0.63W
3039	4822 051 30101	100Ω 5% 0.062W
3040	4822 051 30103	10k 5% 0.062W
3041	4822 051 30562	5k6 5% 0.063W
3044	2120 108 92846	4k7 5%
3058	4822 051 30682	6k8 5% 0.062W

3059	2322 704 66201	620Ω 1%
3060	4822 051 30103	10k 5% 0.062W
3061	4822 051 30103	10k 5% 0.062W
3062	4822 051 30103	10k 5% 0.062W
3064	4822 117 13522	100Ω 5% 0.63W
3073	4822 051 30471	470Ω 5% 0.062W
3074	4822 051 30471	470Ω 5% 0.062W
3075	4822 051 30103	10k 5% 0.062W
3076	4822 051 30471	470Ω 5% 0.062W
3077	4822 051 30272	2k7 5% 0.062W
3078	4822 051 30471	470Ω 5% 0.062W
3079	4822 051 30471	470Ω 5% 0.062W
3080	4822 051 30103	10k 5% 0.062W
3081	4822 051 30471	470Ω 5% 0.062W
3083	4822 051 30471	470Ω 5% 0.062W
3084	4822 051 30103	10k 5% 0.062W
3085	4822 051 30471	470Ω 5% 0.062W
3086	4822 051 30471	470Ω 5% 0.062W
3087	4822 051 30471	470Ω 5% 0.062W
3088	4822 051 30471	470Ω 5% 0.062W
3090	4822 051 30471	470Ω 5% 0.062W
3091	4822 051 30471	470Ω 5% 0.062W
3092	4822 051 30221	220Ω 5% 0.062W
3300	2322 750 63908	3Ω9 5%
3304	2322 750 63908	3Ω9 5%
3306	4822 051 30221	220Ω 5% 0.062W
3307	4822 051 30183	18k 5% 0.062W
3308	4822 051 30684	680k 5% 0.062W
3310	4822 117 12925	47k 1% 0.063W
3311	4822 117 13632	100k 1% 0.62W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30102	1k 5% 0.062W
3316	4822 051 30123	12k 5% 0.062W
3317	4822 051 30221	220Ω 5% 0.062W
3318	4822 051 30102	1k 5% 0.062W
3320	4822 051 30101	100Ω 5% 0.062W
3321	4822 051 30101	100Ω 5% 0.062W
3322	4822 051 10102	1k 2% 0.25W
3324	4822 051 30222	2k2 5% 0.062W
3327	4822 117 13632	100k 1% 0.62W
3328	4822 051 30393	39k 5% 0.062W
3329	4822 117 13568	6Ω8 5%
3330	4822 051 30332	3k3 5% 0.062W
3331	4822 051 30102	1k 5% 0.062W
3333	4822 051 30102	1k 5% 0.062W
3334	4822 051 30102	1k 5% 0.062W
3335	4822 051 30332	3k3 5% 0.062W
3336	4822 051 30102	1k 5% 0.062W
3337	4822 117 12903	1k8 1% 0.063W
3338	4822 051 30682	6k8 5% 0.062W
3340	4822 051 30101	100Ω 5% 0.062W
3341	4822 051 30101	100Ω 5% 0.062W
3342	4822 051 30101	100Ω 5% 0.062W
3343	4822 051 30683	68k 5% 0.062W
3344	4822 051 30222	2k2 5% 0.062W
3345	4822 051 30103	10k 5% 0.062W
3346	4822 051 30333	33k 5% 0.062W
3347	4822 051 30223	22k 5% 0.062W
3348	4822 051 30222	2k2 5% 0.062W
3362	4822 051 30103	10k 5% 0.062W
3363	4822 051 30102	1k 5% 0.062W
3364	4822 051 30683	68k 5% 0.062W
3365	4822 051 30472	4k7 5% 0.062W
3366	4822 051 30102	1k 5% 0.062W
3367	4822 051 30102	1k 5% 0.062W
3370	4822 051 30101	100Ω 5% 0.062W
3371	4822 051 30479	47Ω 5% 0.062W
3372	4822 051 30471	470Ω 5% 0.062W
3376	4822 051 30101	100Ω 5% 0.062W
3377	4822 051 30101	100Ω 5% 0.062W
3378	4822 051 30153	15k 5% 0.062W
3382	4822 051 30471	470Ω 5% 0.062W
3384	4822 051 30101	100Ω 5% 0.062W
3385	4822 051 30471	470Ω 5% 0.062W
3386	4822 051 30223	22k 5% 0.062W
3388	4822 051 30102	1k 5% 0.062W
3389	4822 117 12925	47k 1% 0.063W
3390	4822 051 30153	15k 5% 0.062W
3391	4822 051 30683	68k 5% 0.062W
3393	4822 117 13632	100k 1% 0.62W
3394	4822 051 30472	4k7 5% 0.062W
3400	4822 117 11152	4Ω7 5%
3406	4822 051 30479	47Ω 5% 0.062W
3411	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30472	4k7 5% 0.062W
3415	4822 117 12902	8k2 1% 0.063W
3416	4822 117 13568	6Ω8 5%
3418	4822 051 30391	390Ω 5% 0.062W
3419	4822 051 30759	75Ω 5% 0.062W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 051 30221	220Ω 5% 0.062W

3437	4822 051 30102	1k 5% 0.062W
3439	4822 051 30471	470Ω 5% 0.062W
3441	4822 051 30393	39k 5% 0.062W
3445	4822 051 30471	470Ω 5% 0.062W
3446	4822 051 30101	100Ω 5% 0.062W
3532	4822 051 30102	1k 5% 0.062W
3533	4822 051 30103	10k 5% 0.062W
3540	4822 051 30103	10k 5% 0.062W
3550	4822 051 30102	1k 5% 0.062W
3551	4822 051 30102	1k 5% 0.062W
3552	4822 051 30472	4k7 5% 0.062W
3610	4822 117 12925	47k 1% 0.063W
3611	4822 117 12925	47k 1% 0.063W
3612	4822 117 12925	47k 1% 0.063W
3613	4822 117 12925	47k 1% 0.063W
3614	4822 117 12925	47k 1% 0.063W
3615	4822 117 12925	47k 1% 0.063W
3616	4822 051 30682	6k8 5% 0.062W
3617	4822 051 30682	6k8 5% 0.062W
3621	4822 051 30105	1M 5% 0.062W
3636	4822 051 30105	1M 5% 0.062W
3637	4822 051 30105	1M 5% 0.062W
3638	4822 051 30105	1M 5% 0.062W
3642	4822 051 30105	1M 5% 0.062W
3644	4822 051 30105	1M 5% 0.062W
3653	3198 021 90030	JUMPER
3654	3198 021 90030	JUMPER
3655	4822 051 30101	100Ω 5% 0.062W
3656	4822 051 30101	100Ω 5% 0.062W
3657	4822 051 30334	330k 5% 0.062W
3658	4822 051 30334	330k 5% 0.062W
3659	4822 051 30334	330k 5% 0.062W
3660	4822 051 30334	330k 5% 0.062W
3661	4822 117 11817	1k2 1% 1/16W
3662	4822 117 11817	1k2 1% 1/16W
3663	4822 117 11817	1k2 1% 1/16W
3665	4822 051 30272	2k7 5% 0.062W
3673	4822 051 30472	4k7 5% 0.062W
3676	4822 117 11817	1k2 1% 1/16W
3677	4822 051 30334	330k 5% 0.062W
3678	4822 117 11817	1k2 1% 1/16W
3679	4822 051 30334	330k 5% 0.062W
3680	4822 117 11817	1k2 1% 1/16W
3683	4822 051 30272	2k7 5% 0.062W
3684	3198 021 90030	JUMPER
3685	3198 021 90030	JUMPER
3688	3198 021 90030	JUMPER
3689	3198 021 90030	JUMPER
3702	4822 117 12139	22Ω 5% 0.062W
3703	4822 051 30101	100Ω 5% 0.062W
3705	4822 051 30101	100Ω 5% 0.062W
3706	4822 051 30109	10Ω 5% 0.062W
3707	4822 051 30392	3k9 5% 0.063W
3708	4822 051 30272	2k7 5% 0.062W
3709	3198 021 90030	JUMPER
3710	4822 051 30391	390Ω 5% 0.062W
3711	4822 051 30102	1k 5% 0.062W
3712	4822 051 30391	390Ω 5% 0.062W
3713	4822 051 30391	390Ω 5% 0.062W
3714	4822 117 12139	22Ω 5% 0.062W
3716	4822 051 30472	4k7 5% 0.062W
3717	4822 051 30472	4k7 5% 0.062W
3718	4822 051 30221	220Ω 5% 0.062W
3719	4822 117 13574	1Ω5 5% 1206
3720	4822 117 13574	1Ω5 5% 1206
3721	4822 117 13572	22Ω 5% 1206
3722	4822 117 13572	22Ω 5% 1206
3725	4822 051 30105	1M 5% 0.062W
3728	4822 051 30101	100Ω 5% 0.062W
3731	4822 051 30101	100Ω 5% 0.062W
3732	4822 051 10102	1k 2% 0.25W
3733	4822 051 30101	100Ω 5% 0.062W
3739	4822 051 30101	100Ω 5% 0.062W
3740	3198 021 90030	JUMPER
3741	4822 051 30102	1k 5% 0.062W
3744	4822 051 30102	1k 5% 0.062W
3745	4822 051 30102	1k 5% 0.062W
3746	4822 051 30472	4k7 5% 0.062W
3747	4822 051 30689	68Ω 5%
3748	4822 051 30689	68Ω 5%
3749	4822 051 30689	68Ω 5% 0.063W
3754	4822 051 30109	10Ω 5% 0.062W
3755	3198 021 90030	JUMPER
3757	3198 021 90030	JUMPER
3759	3198 021 90030	JUMPER
3790	4822 117 13522	100Ω 5% 0.63W
3791	4822 117 13522	100Ω 5% 0.63W
3792	4822 117 13522	100Ω 5% 0.63W
3793	4822 117 12662	10Ω 5%
3793	4822 117 13522	100Ω 5% 0.63W
3794	4822 117 12662	10Ω 5%

3794	4822 117 13522	100Ω 5% 0.63W
3795	4822 117 12662	10Ω 5%
3795	4822 117 13522	100Ω 5% 0.63W
3796	4822 051 30101	100Ω 5% 0.062W
3796	4822 051 30109	10Ω 5% 0.062W
3797	4822 051 30101	100Ω 5% 0.062W
3900	4822 051 30221	220Ω 5% 0.062W
3901	4822 051 30221	220Ω 5% 0.062W
3903	4822 051 30221	220Ω 5% 0.062W
3905	4822 051 30221	220Ω 5% 0.062W
3906	4822 051 30101	100Ω 5% 0.062W
3907	4822 051 30221	220Ω 5% 0.062W
3909	4822 051 30221	220Ω 5% 0.062W
3910	4822 051 30221	220Ω 5% 0.062W
3911	4822 051 30101	100Ω 5% 0.062W

5301	4822 157 11876	6.8μH 10%
5302	4822 157 11876	6.8μH 10%
5403	2422 549 44461	IND VAR 40mH
5404	2422 535 95427	100mH
5405	2422 535 95427	IND FXD 100mHz 120R
5406	3198 018 33980	3U9 10%
5407	3198 018 56880	6U8 10%
5408	2422 549 44459	IND VAR 78mH
5409	3198 018 51080	1U 10%
5410	3198 018 33370	0U33 10%
5651	2422 549 43769	100mH
5652	2422 549 43769	100mH
5653	2422 549 43769	100mH
5654	4822 157 11716	BLM21P300SPT
5701	4822 157 71206	BLM21A601SPT
5702	2422 535 95427	100mH
5703	4822 157 11716	BLM21P300SPT
5704	4822 157 11716	BLM21P300SPT
5705	2422 535 95427	100mH
5706	4822 157 11778	5U6 10%
5707	4822 157 11781	BLM11A601SPT1
5708	4822 157 11778	5U6 10%
5709	4822 157 11778	5U6 10%
5710	4822 157 11778	5U6 10%
5711	4822 157 11781	BLM11A601SPT1
5713	4822 157 11781	BLM11A601SPT1
5718	3198 018 33370	0U33 10%
5720	4822 157 11781	BLM11A601SPT1
5910	4822 157 11781	BLM11A601SPT1

6001	4822 130 11528	1PS76SB10
6003	4822 130 11528	1PS76SB10
6303	4822 130 11594	BZX284-C47
6304	4822 130 83757	BAS216
6306	9322 129 37685	BZM55-C5V6
6307	4822 130 11528	1PS76SB10
6309	4822 130 83757	BAS216
6310	9322 129 38685	BZM55-C6V8
6311	9322 149 08685	BZM55-C22
6319	4822 130 83757	BAS216
6334	4822 130 83757	BAS216
6403	4822 130 10414	BA792
6652	9322 129 40685	BZM55-C10
6653	4822 130 83757	BAS216

7001	9352 629 88557	SAA5801/011 V30
7002	5322 130 42756	BC857C
7003	3198 010 42310	BC847BW
7004	3198 010 42310	BC847BW
7005	9322 116 74668	LD1117D33
7006	3104 317 42211	SOFTW.ASSY 310431702211
7007	9322 136 53668	MSM51V18165D-60JS
7008	3198 010 42310	BC847BW
7009	3198 010 42310	BC847BW
7010	5322 130 42756	BC857C
7011	4822 209 17377	M24C32-WMN6/PROG
7301	9352 625 23518	TDA9330H/N2
7303	5322 130 42756	BC857C
7308	9340 310 30215	PDTC144ET
7309	9340 310 30215	PDTC144ET
7310	9340 310 30215	PDTC144ET
7311	3198 010 42310	BC847BW
7312	3198 010 42310	BC847BW
7320	3198 010 42310	BC847BW
7322	3198 010 42310	BC847BW
7323	9352 625 24518	TDA9321H/N2

7324	5322 130 63679	BC847CW
7403	4822 130 60511	BC847B
7407	4822 130 60373	BC856B
7411	4822 130 60511	BC847B
7651	9322 143 53671	MSP3415D-FH-B3
7651	9322 149 63671	MSP3451G-FH-A1
7652	9351 874 90118	74HC4052PW
7656	9340 425 20115	BC847BS
7658	9340 425 20115	BC847BS
7663	9340 425 20115	BC847BS
7674	3198 010 42310	BC847BW
7675	9351 874 90118	74HC4052PW
7680	3198 010 42310	BC847BW
7681	3198 010 42310	BC847BW
7701	5322 130 42756	BC857C
7702	3198 010 42310	BC847BW
7704	4822 209 73852	PMBT2369
7708	4822 209 90034	SAA4990H/V0
7709	9352 640 20557	SAA4978H/V203
7713	9322 116 74668	LD1117D33
7714	4822 209 17307	MSM54V12222A-30JS
7715	4822 209 17307	MSM54V12222A-30JS
7716	2422 486 80737	IC SOCKET 32P
	3104 317 42341	IC SOFTWARE

Main Switch Panel [E]

Various

0151	4822 256 91766	LED HOLDER
0201	2422 025 16268	2P MALE
0202	2422 025 16374	2P MALE
0923	2412 020 00724	2P MALE
0947	4822 267 10734	5P MALE
1910	4822 130 91478	IR RECEIVER
1951	4822 276 14024	2P 4/128A

⊣⊢

2930	4822 124 41584	100µF 20% 10V

-▭-

3957	4822 053 21335	3M3 5% 0.5W
3966	4822 053 21335	3M3 5% 0.5W
3978	4822 051 20101	100Ω 5% 0.1W
3982	4822 117 13577	330Ω 1% 1.25W

▶|

6901	4822 130 10859	TLDR5400

CRT Panel [F]

Various

0298	2422 500 80052	9P FEMALE
0340	3104 311 02321	CABLE 11P 400mm
0383	2422 025 16382	3P MALE

⊣⊢

2300	4822 124 40764	22µF 100 V
2301	4822 124 40196	220µF 20% 16V
2302	5322 122 32286	3.3pF 5% 50V
2303	5322 122 32268	470pF 10% 50V
2304	4822 121 41856	22nF 5% 250V
2305	4822 124 41751	47µF 20% 50V
2306	4822 126 14585	100nF 10% 50V
2307	5322 122 32654	22nF 10% 63V
2308	4822 126 13486	15pF 2% 63V
2309	5322 122 32654	22nF 10% 63V
2310	4822 126 13689	18pF 1% 63V
2312	5322 122 32658	22pF 5% 50V
2313	4822 124 11565	10µF 20% 250V
2316	4822 121 40518	100nF 10% 250V
2317	5322 121 44356	4.7nF 5% 2KV
2318	5322 122 32654	22nF 10% 63V
2320	4822 126 13838	100nF 20% 50V
2321	5322 122 32531	100pF 5% 50V
2322	5322 122 32531	100pF 5% 50V
2323	5322 122 32531	100pF 5% 50V
2325	4822 126 14585	100nF 10% 50V

-▭-

3300	4822 052 10109	10Ω 5% 0.33W
3301	4822 053 12103	10k 5% 3W
3302	4822 051 20182	1k8 5% 0.1W
3303	4822 117 10965	18k 1% 0.1W
3304	4822 117 11454	820Ω 1% 0.1W
3305	4822 117 13577	330Ω 1% 1.25W
3306	4822 051 20478	4Ω7 5% 0.1W
3307	4822 051 20109	10Ω 5% 0.1W
3308	4822 117 11148	56k 1% 0.1W
3309	4822 117 10353	150Ω 1% 0.1W
3310	4822 051 10102	1k 2% 0.25W
3311	4822 051 20101	100Ω 5% 0.1W
3312	4822 117 11449	2k2 1% 0.1W
3313	4822 116 83872	220Ω 5% 0.5W
3314	4822 116 83872	220Ω 5% 0.5W
3315	4822 117 11139	1k5 1% 0.1W
3316	4822 117 11148	56k 1% 0.1W
3317	4822 051 20122	1k2 5% 0.1W
3318	4822 051 20159	15Ω 5% 0.1W
3319	4822 117 11454	820Ω 1% 0.1W
3320	4822 051 10102	1k 2% 0.25W
3334	4822 050 11002	1k 1% 0.4W
3335	4822 051 10102	1k 2% 0.25W
3336	4822 051 10102	1k 2% 0.25W
3337	4822 051 10102	1k 2% 0.25W
3338	3198 013 01020	1k 2% 1/2W
3339	3198 013 01020	1k 2% 1/2W
3340	3198 013 01020	1k 2% 1/2W
3341	4822 052 10151	150Ω 5% 0.33W
3342	4822 051 20471	470Ω 5% 0.1W
3344	4822 116 52191	33Ω 5% 0.5W
3345	4822 116 52191	33Ω 5% 0.5W
3347	3198 013 01520	1k5 2% 1/2W
3348	4822 050 11204	120k 1% 0.4W
3349	3198 013 01020	1k 2% 1/2W
3350	4822 116 83883	470Ω 5% 0.5W
3351	4822 116 83883	470Ω 5% 0.5W
3352	4822 116 83883	470Ω 5% 0.5W
3354	4822 117 11449	2k2 1% 0.1W
3355	4822 051 20478	4Ω7 5% 0.1W
3356	4822 051 10102	1k 2% 0.25W
3357	4822 051 20478	4Ω7 5% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

〰

5300	2422 531 98035	TFM S13974-01 Y

▶|

6305	4822 130 30842	BAV21
6306	4822 130 30842	BAV21
6307	4822 130 30842	BAV21
6310	4822 130 83757	BAS216

⊗▭

7300	4822 130 44154	BF199
7301	4822 130 42589	BF370
7302	5322 130 41888	BD140-16
7303	5322 130 41886	BD139-16
7307	9352 561 40112	TDA6108
8317	3104 311 01901	CABLE 2P 560mm
8325	3104 311 01911	CABLE 3P 680mm

Side I/O Panel [O]

Various

0900	2422 026 04926	4P FEMALE
0901	4822 267 10975	3P
0902	4822 267 31014	HEADPHONE SOCKET
0936	2422 025 12485	11P MALE

⊣⊢

2905	4822 122 33177	10nF 20% 50V
2906	4822 122 33177	10nF 20% 50V

-▭-

3901	4822 051 20101	100Ω 5% 0.1W
3902	4822 116 52201	75Ω 5% 0.5W
3903	4822 051 20101	100Ω 5% 0.1W
3904	4822 116 52201	75Ω 5% 0.5W
3905	4822 050 11002	1k 1% 0.4W
3906	4822 050 11002	1k 1% 0.4W
3907	4822 117 10834	47k 1% 0.1W
3908	4822 050 11002	1k 1% 0.4W
3909	4822 117 10834	47k 1% 0.1W
3910	4822 116 52276	3k9 5% 0.5W
3911	4822 050 21003	10k 1% 0.6W
3912	4822 050 21003	10k 1% 0.6W

Top Control Panel [P]

Various

0345	4822 267 10748	3P MALE
1701	4822 276 13775	SWITCH
1702	4822 276 13775	SWITCH
1703	4822 276 13775	SWITCH
1704	4822 276 13775	SWITCH
1705	4822 276 13775	SWITCH

-▭-

3701	4822 051 20391	390Ω 5% 0.1W
3702	4822 117 13528	200Ω 1% 0.125W
3703	4822 117 10845	620Ω 1% 0.1W
3704	4822 117 11534	1k1 1% 0.1W
3705	4822 117 11951	2k 1% 0.1W
3999	4822 051 10102	1k 2% 0.25W

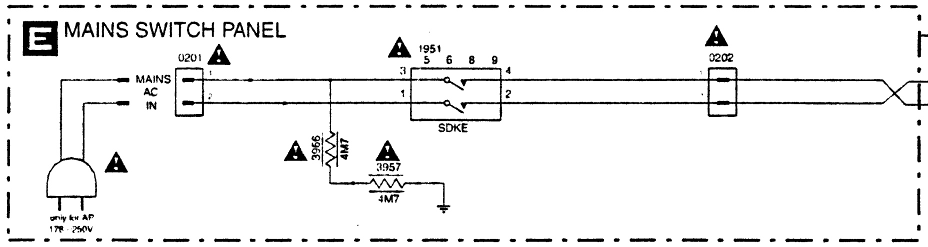
A LSP (Large Signal Panel)

Error	Device	Description	Defective item	Diagram	Defect. module indication
1	29"	NVM	7011	B5	Control
2	1N	HFB			Horizontal Flyback
3	560N	PICNIC	7709	B3	Feature Box
4	-	5V2			+5V Supply
5	10N	8V6			+8V Supply
6	22N				Slow I²C blocked
7	6N8	HOP video control/geometry	7301	B4	Video Controller
8	560N	HIP I/O-video processing	7323	B2	Chroma IF IO
9	-			A3	
10	1N				
11	3W 15R				
12	100R	TUNER_PROT			+8V (Tuner) Supply
13	6K8	Tuner	U1200	A7	Tuner
14	-	ITT sound processor + Dolby	7651	B6	Audio Module
15	22K				
16	FUSE 8R2	FBX_PROT			

Error Code Table

Error messages

E MAINS SWITCH PANEL



0201
MAINS AC IN
1951
SDKE
0202
3956 4M7
3957 4M7
only for AP 178 - 250V

Diversity Tables

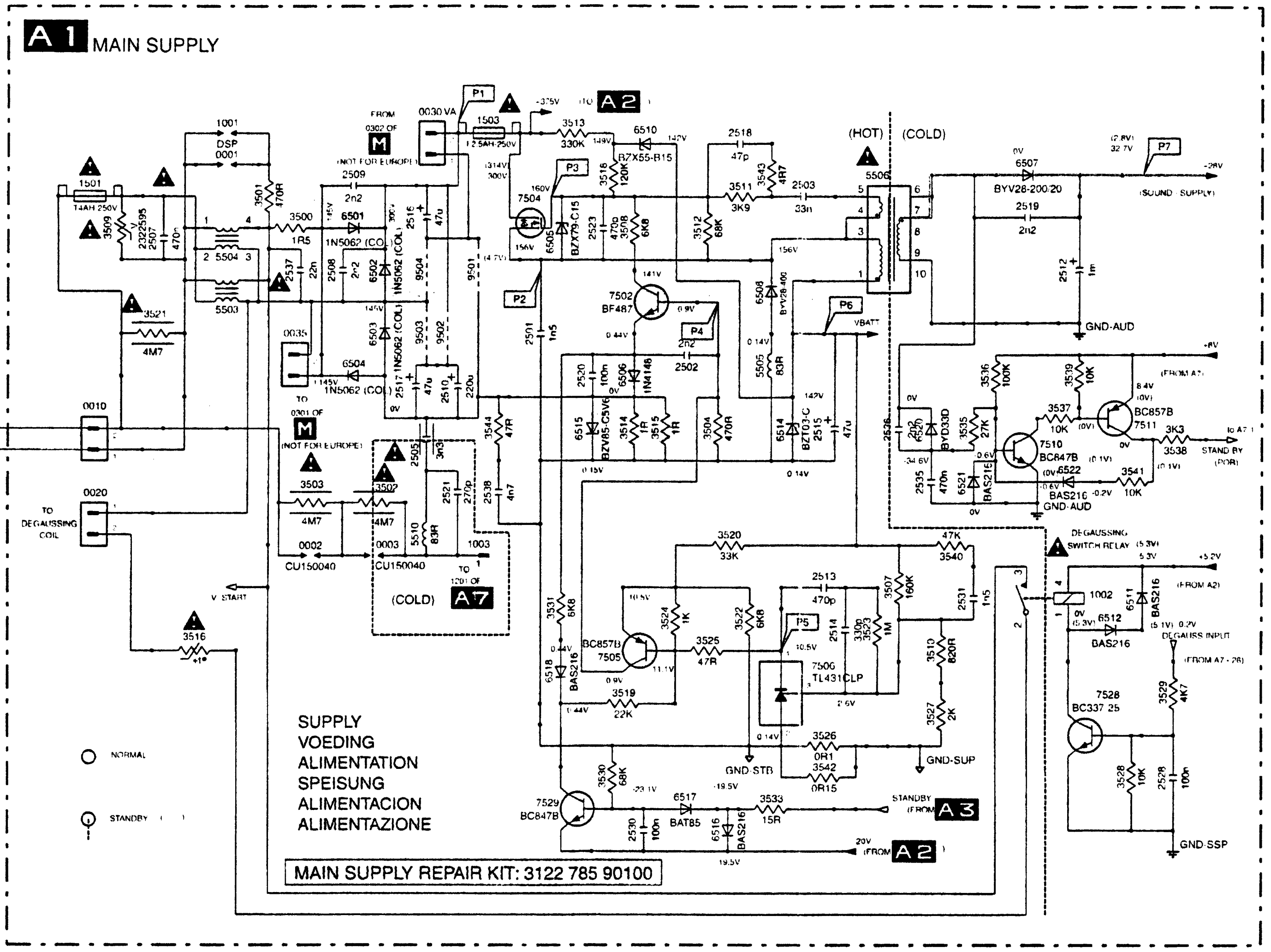
Diversity Large Signal Panel (A1)					
PosNr	29"	25"	28"	28" WS	32" WS
8000	CBLE DIP 2P/340mm	CBLE HR 3P/340mm	CBLE HR 3P/340mm	CBLE DIP 2P/340mm	CBLE DIP 2P/340mm

Diversity Large Signal Panel (A3)					
PosNr	29"	25"	28"	28" WS	32" WS
2420	1N	1N	1N	560P	1N
2421	560N	560N	470N	-	-
2422	-	-	-	21U2	21U2
2425	10N	9N1	-	11N	11N
2426	22N	24N	24N	24N	24N
2431	6N8	3N3	3N3	3N3	3N3
2433	560N	390N	470N	390N	430N
2435	-	-	9N1	-	-
2455	1N	-	-	3N3	3N3
3415	3W 15R	3W 15R	3W 15R	PR03 12R	PR03 12R
3431	100R	220R	220R	220R	220R
3450	6K8	-	-	10K	10K
3450	-	8K2	8K2	-	-
3451	22K	22K	22K	10K	10K
3466	FUSE 8R2	6R8	FUSE 8R2	1R	1R
3488	330K	220K	220K	220K	120K
5421	COI LINCOR DRUM	COI LINCOR DC12 8MH	COI LINCOR DRUM	COI LINCOR DRUM	COI LINCOR DRUM
5422	COI BRIDGE	-	-	COI BRIDGE	COI BRIDGE
5424	-	COI BRIDGE	COI BRIDGE	-	-
5430	LOT 30KV ISO ELDOR	LOT PWRSL. 27K5	LOT PWRSL. 27K5	LOT PWRSL. 30KV	LOT PWRSL. 30KV
2445	-	-	-	-	1U
2446	-	-	-	-	470P
2447	-	-	-	-	470P
3439	-	-	-	-	100R
3440	-	-	-	-	22K
3441	-	-	-	-	470K
3442	-	-	-	-	470K
3443	-	-	-	-	100R
3444	-	-	-	-	39K
3445	-	-	-	-	2K2
3446	-	-	-	-	2K2
3447	-	-	-	-	22R
4441	-	-	-	-	JUMP
6440	-	-	-	-	SMAS216
6441	-	-	-	-	SMAS216

Diversity Large Signal Panel (A4)					
PosNr	29"	25"	28"	28" WS	32" WS
0390	-	-	-	-	CON 03P
3602	3K3	3K3	3K3	-	-
3611	-	-	-	8K2	8K2
3614	1M	1M	1M	1M2	1M2
3615	470K	560K	560K	560K	560K
3621	1R	1R5	1R5	1R5	1R5
3622	1R	1R	1R	1R8	1R8
6600	1N4148	1N4148	1N4148	SIGAT85	SIGAT85
6621	ECYD33D	-	-	ECYD33D	ECYD33D
6622	DIO	-	-	DIO	DIO
7440	-	-	-	-	LM358N
7441	-	-	-	-	SIGC547B
7442	-	-	-	-	SIGC557B
9622	-	WR	WR	-	-

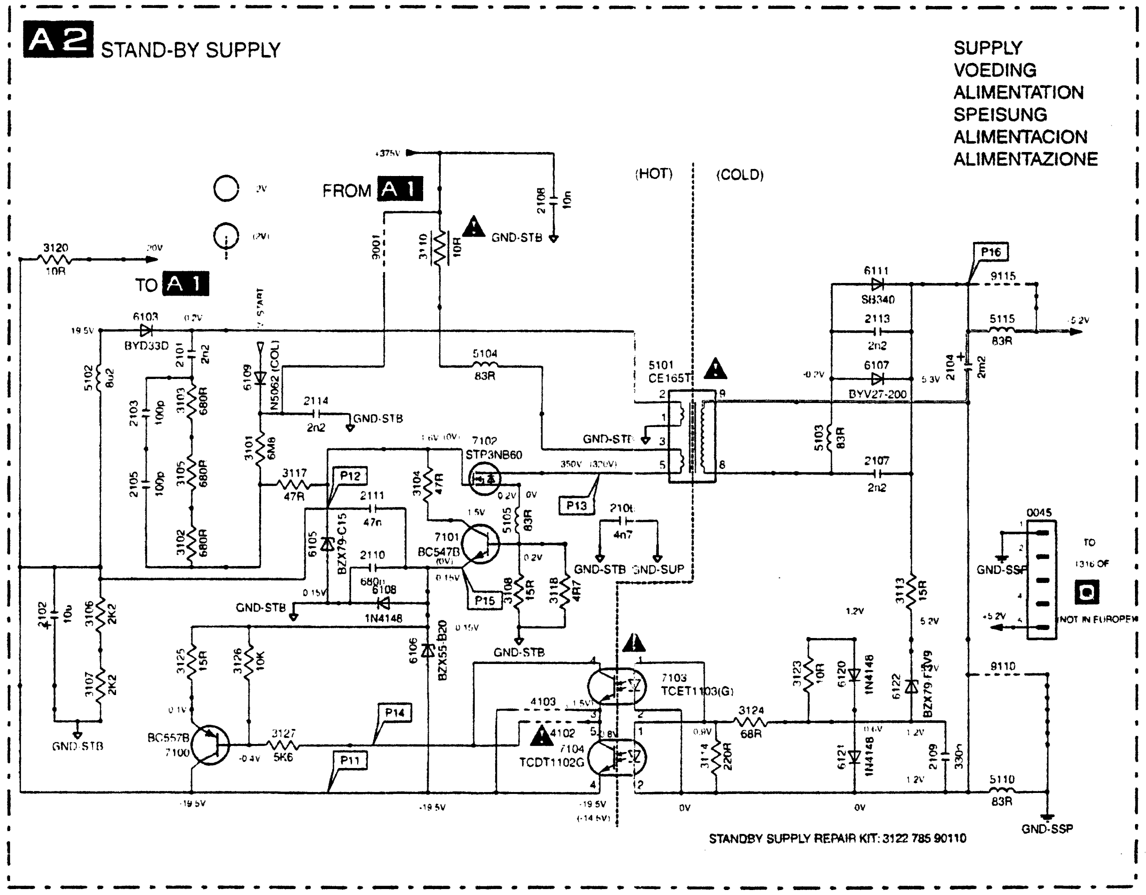
Diversity Small Signal Panel (B6)			
Item	100HZ INCR ST	DS VIRT DLB	100HZ DLB
2636	220N	-	-
2638	220N	-	-
2641	220N	-	-
2642	220N	-	-
2663	-	470P	470P
2664	-	470P	470P
2677	2U2	10U	10U
2678	-	10U	10U
2678	-	10U	10U
2685	-	1N	1N
2686	-	1N	1N
2692	100N	-	-
3552	4K7	-	-
3617	6K8	-	-
3636	1M	-	-
3638	1M	-	-
3642	1M	-	-
3644	1M	-	-
3657	330K	-	-
3659	330K	-	-
3661	1K2	-	-
3663	1K2	-	-
3665	2K7	-	-
3676	1K2	-	-
3677	330K	-	-
3678	1K2	-	-
3679	330K	-	-
4605	-	JUMP	JUMP
4606	-	JUMP	JUMP
4613	-	JUMP	JUMP
4615	-	JUMP	JUMP
4620	-	JUMP	JUMP
4621	-	JUMP	JUMP
4630	JUMP	-	-
4631	JUMP	-	-
4632	-	JUMP	JUMP
4633	-	JUMP	JUMP
4634	-	JUMP	JUMP
4635	-	JUMP	JUMP
4650	-	JUMP	JUMP
4651	-	JUMP	JUMP
4678	-	JUMP	JUMP
4679	-	JUMP	JUMP
4680	JUMP	-	-
4681	JUMP	-	-
7651	MSP3415D-FH-B3	MSP3451G-FH-A1	MSP3451G-FH-A1
7658	BC847BS	-	-
7663	BC847BS	-	-
7675	74HC4052PW	-	-
7681	BC847BW	-	-

A1 MAIN SUPPLY



FROM 0302 OF M (NOT FOR EUROPE)
A2
1501 T4AH 250V
1001 DSP 0001
5504
5503
3500 1R5
6501 1N5062 (COL)
6504 1N5062 (COL)
1503 T2.5AH 250V
7504
3513 330K
6510 BZX55-B15
2518 47p
(HOT)
(COLD)
5506
6507 BYV28-200/20
2519 2n2
P7
(SOUND SUPPLY)
7502 BF487
P2
P3
P4
P6
VBATT
GND-AUD
0010
0020
TO DEGAUSSING COIL
TO 0301 OF M (NOT FOR EUROPE)
3503 4M7
3507 4M7
0002 CU150040
0003 CU150040
(COLD)
A7
TO 1201 OF
V START
3516
3520 33K
3540 47K
7505 BC857B
7506 TL431CLP
P5
7529 BC847B
6517 BAT85
3533 15R
STANDBY (FROM A3)
20V (FROM A2)
7510 BC847B
7511 BC857B
DEGAUSSING SWITCH RELAY
1002
7528 BC337-25
GND-SUP
GND-SSP
GND-STB
NORMAL
STANDBY
SUPPLY
VOEDING
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE
MAIN SUPPLY REPAIR KIT: 3122 785 90100

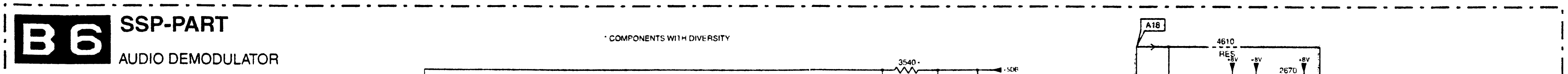
A2 STAND-BY SUPPLY



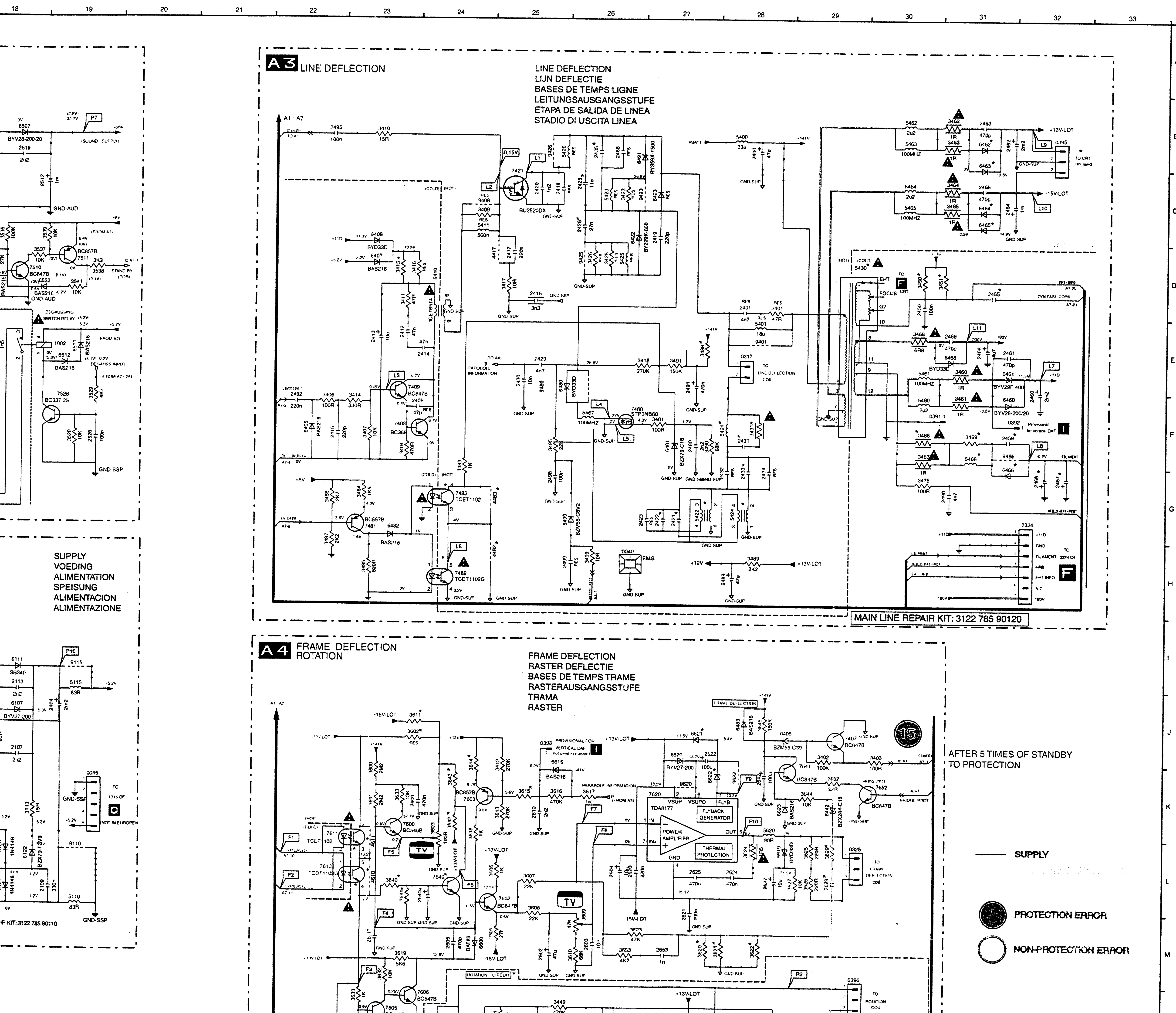
SUPPLY
VOEDING
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE
FROM A1
(HOT)
(COLD)
TO A1
3120 10R
6103 BYD33D
5101 CE165T
7102 STP3NB60
7101 BC547B
P11
P12
P13
P14
P15
P16
6111 SB340
6107 BYV27-200
5115 83R
0045
TO 1316 OF O (NOT IN EUROPE)
7103 TCET1103(G)
7104 TCDT1102G
7100 BC557B
GND-STB
GND-SUP
GND-SSP
STANDBY SUPPLY REPAIR KIT: 3122 785 90110

B6 SSP-PART

AUDIO DEMODULATOR

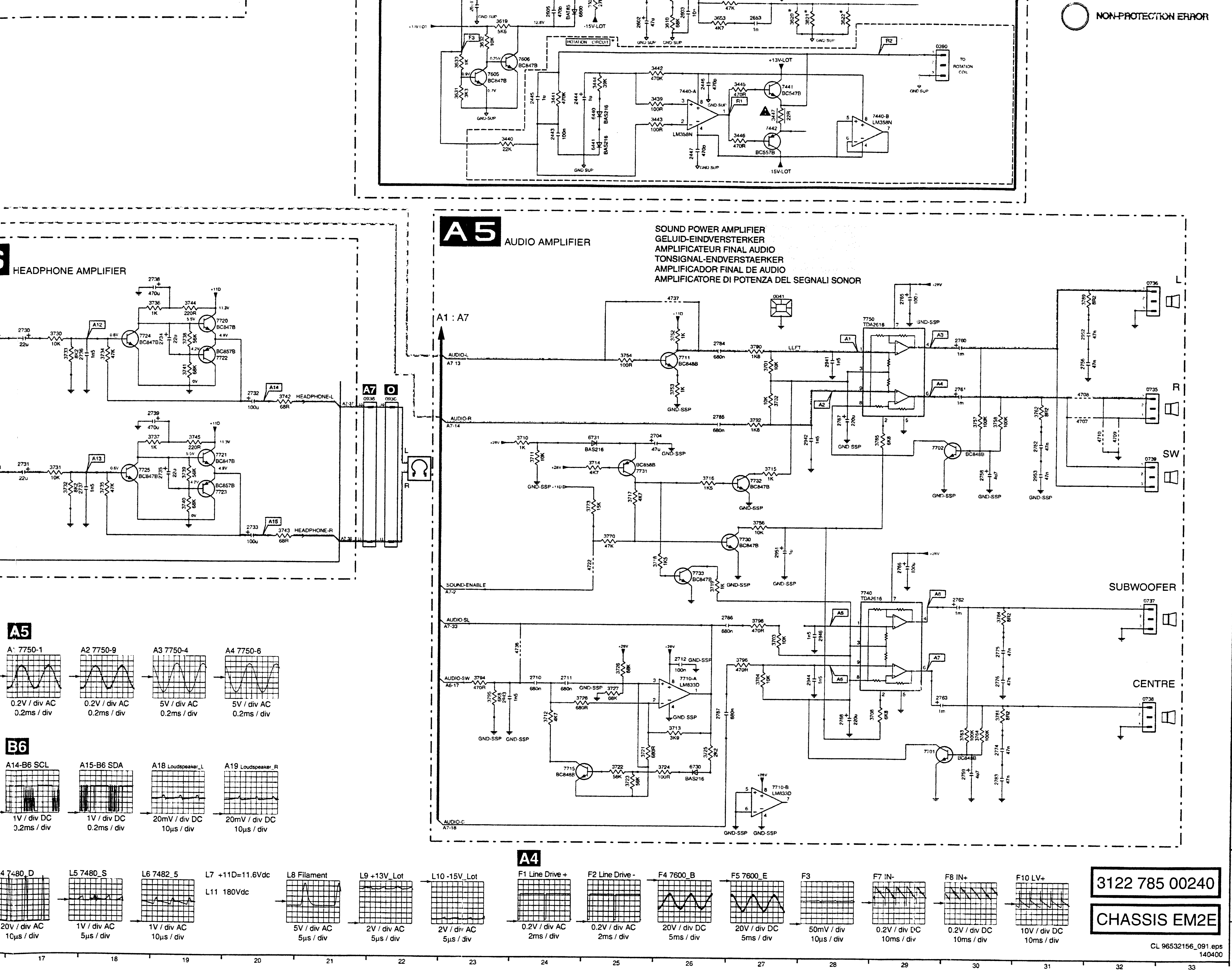


* COMPONENTS WITH DIVERSITY
A18
4610 RES
2670
3540


A3 LINE DEFLECTION
LINE DEFLECTION
LIJN DEFLECTIE
BASES DE TEMPS LIGNE
LEITUNGSAUSGANGSSTUFE
ETAPA DE SALIDA DE LINEA
STADIO DI USCITA LINEA
MAIN LINE REPAIR KIT: 3122 785 90120
SUPPLY
VOEDING
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE
A4 FRAME DEFLECTION ROTATION
FRAME DEFLECTION
RASTER DEFLECTIE
BASES DE TEMPS TRAME
RASTERAUSGANGSSTUFE
TRAMA
RASTER
AFTER 5 TIMES OF STANDBY TO PROTECTION
SUPPLY
PROTECTION ERROR
NON-PROTECTION ERROR
IR KIT: 3122 785 90110
TDA8177
POWER AMPLIFIER
FLYBACK GENERATOR
THERMAL PROTECTION
BU2520DX
STP3NB60
TCET1102
TCDT1102G
BC847B
BC857B
BC368
BYV29F-400
BYV28-200/20
BY359X-1500
BY229X-600
BZM55-C8V2
EHT
FOCUS
G2
EMG
LINE DEFLECTION COIL
FRAME DEFLECTION COIL
ROTATION COIL
ROTATION CIRCUIT
TV
15

0001	B3	3107	L13	3739	S20	7733	U26
0002	D13	3108	K16	3740	T20	7740	U28
0003	D14	3110	I15	3741	R20	7750	Q28
0010	C12	3113	K18	3742	R21	9001	I15
0020	D12	3114	L17	3743	T21	9110	L19
0030	B14	3117	J14	3744	Q20	9401	E28
0035	C13	3120	I13	3745	S20	9408	C24
0045	K19	3118	K16	3752	Q26	9423	C26
0041	Q27	3125	L14	3753	R26	9425	D26
0201	D6	3126	L14	3754	R25	9501	B14
0202	D12	3123	L18	3756	T27	9502	C14
0325	L29	3124	L17	3757	R30	9503	C14
0393	J25	3127	L14	3758	R30	9504	B14
0390	M29	3406	F22	3762	R31	9620	K27
0680	M1	3407	F23	3763	W30		
0681	P1	3402	J29	3764	W30		
0682	U7	3409	C24	3765	S29		
0735	R32	3410	B23	3770	T25		
0736	Q32	3403	J30	3773	T25		
0737	U32	3411	D23	3781	W30		
0738	V32	3414	F23	3784	U30		
0739	S32	3426	D26	3790	Q27		
1001	B13	3431	F28	3794	V23		
1003	D15	3440	O23	3795	W23		
1002	E19	3439	N25	3792	R27		
1501	B12	3441	N24	3789	Q31		
1503	B15	3442	N25	3796	V27		
1651	T9	3443	N25	3798	U27		
2101	J14	3444	N25	3957	D8		
2102	K13	3445	N27	3966	D7		
2103	J14	3446	O27	4102	L16		
2105	J14	3447	N27	4103	L16		
2104	J19	3450	D30	4417	D24		
2106	K17	3451	D30	4482	H24		
2108	I16	3460	E31	4483	G24		
2107	J18	3461	F31	4605	W3		
2110	K15	3468	E30	4606	T3		
2111	K15	3469	F31	4604	W9		
2109	L19	3475	G30	4607	U6		
2114	J15	3484	G23	4608	U6		
2113	I18	3483	G24	4609	U6		
2400	B28	3481	F27	4612	M5		
2401	D28	3500	B13	4610	N12		
2409	F23	3501	B13	4613	M13		
2412	E23	3502	D14	4614	O12		
2413	E23	3503	D13	4615	R13		
2414	E24	3491	E27	4610	L23		
2421	G27	3504	C16	4611	L23		
2422	G27	3495	F25	4620	U14		
2423	G26	3509	B12	4621	W13		
2425	C26	3508	B15	4634	T3		
2426	C26	3507	E17	4630	T8		
2429	E25	3499	H26	4635	T3		
2443	O24	3511	B16	4631	T8		
2444	N24	3510	E18	4632	R10		
2445	N24	3512	B16	4633	S10		
2446	N26	3513	B15	4652	P1		
2447	O26	3514	C15	4654	R2		
2450	D30	3516	E13	4650	U13		
2455	D31	3515	C16	4651	W13		
2459	F31	3518	B15	4653	S14		
2460	E32	3521	C12	4676	W12		
2461	E31	3519	E15	4677	W12		
2462	B31	3520	D16	4682	U7		
2469	E31	3522	E16	4678	R12		
2502	S2	3523	E17	4683	U7		
2503	R2	3524	E16	4679	R12		
2501	Q5	3525	E16	4684	U7		
2504	W2	3532	N9	4685	W7		
2480	F27	3533	N8	4680	R13		
2505	T2	3526	F17	4686	W7		
2506	Q2	3527	E18	4687	W7		
2507	Q2	3530	F15	4681	R14		
2488	B26	3531	E15	4707	R31		
2501	C15	3528	F19	4708	R31		
2489	H28	3529	E19	4709	S32		
2508	O9	3533	F16	4710	S32		
2502	C16	3540	N9	4722	U25		
2491	E27	3535	C18	4736	V24		
2505	D14	3550	O3	4737	Q26		
2507	B12	3551	P2	5102	J13		
2503	B17	3536	C18	5101	J17		
2508	B13	3537	C18	5104	J16		
2490	G31	3552	R3	5103	J18		
2509	B14	3544	M12	5105	K16		
2510	C14	3538	D19	5110	L19		
2512	B18	3539	C18	5115	I19		
2513	D17	3545	P12	5423	C26		
2516	B14	3540	D18	5425	D26		
2514	E17	3542	F17	5426	B25		
2517	C14	3543	B16	5424	G28		
2515	C17	3544	C15	5430	D29		
2518	B16	3546	O13	5460	F30		
2520	C15	3541	D19	5467	F26		
2521	D14	3547	Q13	5503	C13		
2519	B18	3617	R2	5504	B13		
2523	B15	3600	K23	5505	C16		
2530	F16	3601	K23	5506	B17		
2528	F19	3610	O14	5510	D14		
2531	E18	3602	J23	5620	K28		
2537	B13	3611	Q14	5651	W9		
2535	D17	3612	S13	5652	W9		
2536	C17	3613	S13	5653	O9		
2538	D15	3603	K24	5654	U9		
2550	O3	3614	U14	6103	I14		
2551	P2	3615	W14	6105	K15		
2546	S13	3624	M5	6106	K15		
2547	S13	3605	M25	6108	K15		
2548	T14	3616	T14	6109	J14		
2549	W14	3625	M5	6107	J18		
2609	O9	3606	L25	6111	I18		
2610	W10	3607	L25	6120	L18		
2611	W10	3608	L25	6121	L18		
2600	K23	3621	N12	6122	L18		
2601	M23	3611	J23	6406	F22		
2602	M25	3609	M26	6407	D23		

5338


NON-PROTECTION ERROR
ROTATION CIRCUIT
TO ROTATION COIL
A5 AUDIO AMPLIFIER
SOUND POWER AMPLIFIER
GELUID-EINDVERSTERKER
AMPLIFICATEUR FINAL AUDIO
TONSIGNAL-ENDVERSTAERKER
AMPLIFICADOR FINAL DE AUDIO
AMPLIFICATORE DI POTENZA DEL SEGNALI SONOR
HEADPHONE AMPLIFIER
HEADPHONE-L
HEADPHONE-R
A1 : A7
AUDIO-L
AUDIO-R
SOUND-ENABLE
AUDIO-SL
AUDIO-SW
AUDIO-C
7750 TDA2616
7740 TDA2616
7710-A LM833D
7710-B LM833D
7440-A LM358N
7440-B LM358N
L
R
SW
SUBWOOFER
CENTRE
A5
A1 7750-1
0.2V / div AC
0.2ms / div
A2 7750-9
0.2V / div AC
0.2ms / div
A3 7750-4
5V / div AC
0.2ms / div
A4 7750-6
5V / div AC
0.2ms / div
B6
A14-B6 SCL
1V / div DC
0.2ms / div
A15-B6 SDA
1V / div DC
0.2ms / div
A18 Loudspeaker_L
20mV / div DC
10µs / div
A19 Loudspeaker_R
20mV / div DC
10µs / div
4 7480_D
20V / div AC
10µs / div
L5 7480_S
1V / div AC
5µs / div
L6 7482_5
1V / div AC
10µs / div
L7 +11D=11.6Vdc
L11 180Vdc
L8 Filament
5V / div AC
5µs / div
L9 +13V_Lot
2V / div AC
5µs / div
L10 -15V_Lot
2V / div AC
5µs / div
A4
F1 Line Drive +
0.2V / div AC
2ms / div
F2 Line Drive -
0.2V / div AC
2ms / div
F4 7600_B
20V / div DC
5ms / div
F5 7600_E
20V / div DC
5ms / div
F3
50mV / div
10µs / div
F7 IN-
0.2V / div DC
10ms / div
F8 IN+
0.2V / div DC
10ms / div
F10 LV+
10V / div DC
10ms / div
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33

3122 785 00240

CHASSIS EM2E

CL 96532156_091.eps
140400

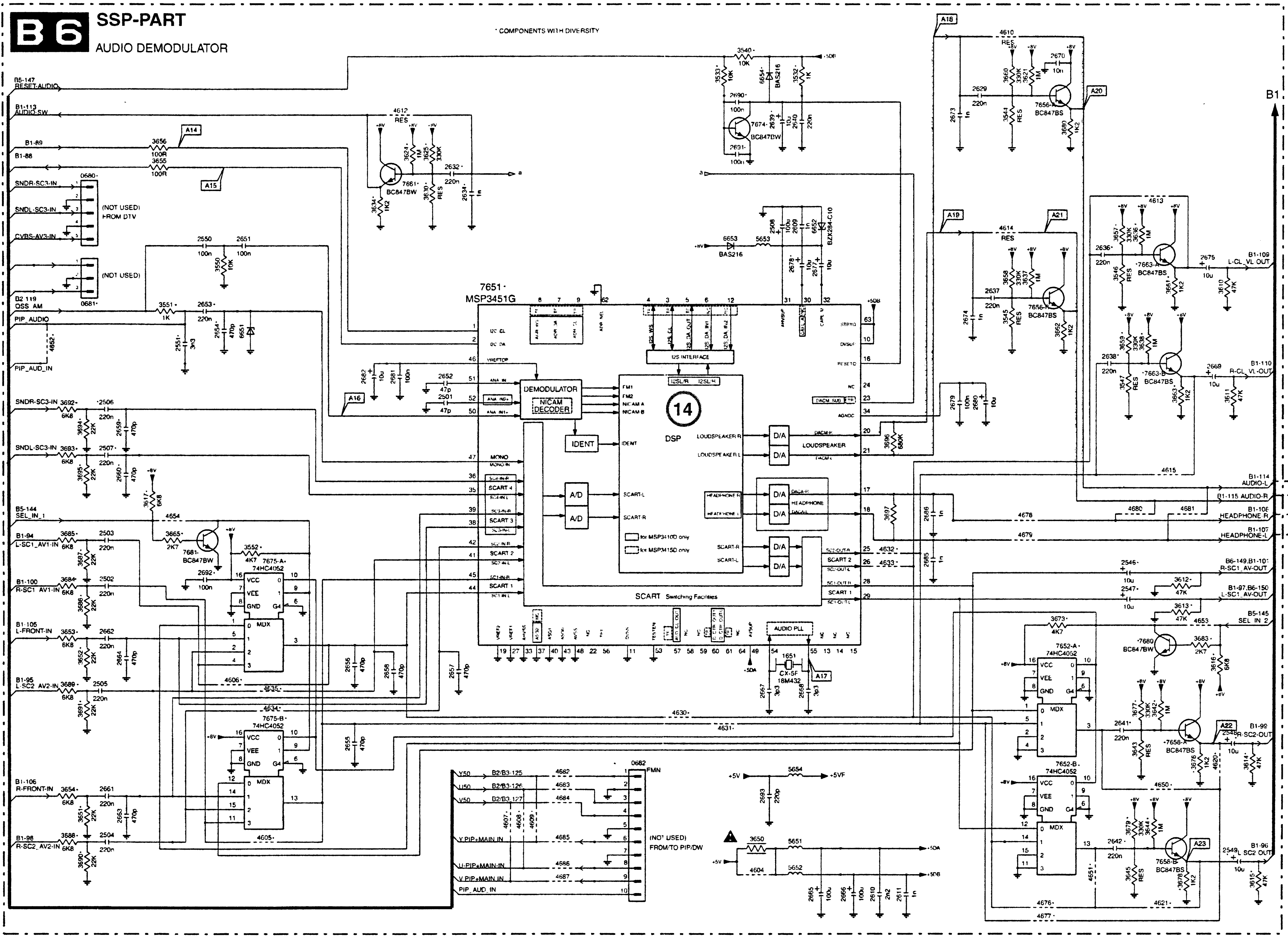
2546	S13	3624	M5	6106	K15
2547	S13	3605	M25	6108	K15
2548	T14	3616	T14	6109	J14
2549	W14	3625	M5	6107	J18
2609	O9	3606	L25	6111	I18
2610	W10	3607	L25	6120	L18
2611	W10	3608	L25	6121	L18
2600	K23	3621	N12	6122	L18
2601	M23	3611	J23	6406	F22
2602	M25	3609	M26	6407	D23
2603	M26	3630	M5	6408	C23
2605	M24	3610	M26	6405	J28
2604	L26	3612	K25	6421	B26
2610	K25	3613	K25	6422	C26
2632	M5	3614	K24	6440	N25
2629	N11	3634	O5	6441	O25
2634	M6	3615	K25	6442	K29
2620	L26	3616	K25	6465	C31
2621	M27	3618	K24	6466	G31
2637	P11	3619	M23	6468	E31
2639	M9	3617	K26	6480	E25
2622	J27	3620	M27	6482	G23
2636	O13	3621	M28	6481	F27
2640	M9	3623	M26	6483	J28
2638	P13	3636	O13	6501	B14
2624	L28	3637	O12	6502	B14
2625	L27	3622	M28	6503	C14
2641	T13	3638	P13	6504	C14
2651	O3	3624	L28	6505	B15
2627	L28	3651	U1	6506	C15
2642	W13	3630	N23	6508	C16
2653	P3	3652	T1	6507	B18
2652	Q5	3625	L29	6510	B16
2654	P3	3631	N23	6511	E19
2629	L29	3653	S1	6515	C15
2655	T4	3626	L29	6512	E19
2656	T4	3632	M23	6514	C17
2659	Q2	3642	T13	6516	F16
2657	T5	3654	U1	6517	F16
2660	R2	3627	L29	6518	E15
2658	T5	3633	K23	6520	C17
2661	U2	3643	U13	6521	D18
2640	L24	3644	U13	6522	D18
2662	S2	3655	M2	6600	M24
2663	U2	3629	L29	6616	K25
2664	T2	3645	W13	6619	L28
2642	K28	3656	M2	6620	J27
2665	W9	3650	W9	6621	J27
2666	W10	3640	L23	6622	K27
2667	T9	3641	L23	6623	K28
2668	T9	3642	K24	6651	P3
2653	M27	3643	K24	6652	O9
2670	N12	3665	R2	6653	O9
2669	P14	3657	O13	6654	N9
2673	M11	3658	O12	6730	X26
2674	P11	3659	P13	6731	S25
2677	O9	3660	N12	7100	L14
2681	P5	3644	K29	7101	K16
2678	O9	3645	J28	7102	J16
2682	P5	3661	O13	7103	L17
2675	O14	3662	P12	7104	L16
2679	Q11	3663	Q13	7440-K	N28
2680	Q11	3653	M26	7440-J	N26
2692	S3	3652	K29	7407	J29
2685	R11	3673	S12	7441	N27
2686	R11	3684	S1	7442	O27
2690	N9	3685	R1	7482	H24
2691	M9	3686	S1	7483	G24
2693	U9	3687	R1	7502	C16
2704	S25	3688	W1	7504	B15
2710	V24	3676	U14	7505	E15
2711	V24	3677	T13	7506	E17
2712	V26	3689	T1	7510	D18
2730	Q18	3678	W13	7511	C19
2731	S18	3690	W1	7529	F15
2732	R21	3679	U13	7528	E19
2733	T21	3680	M12	7600	K23
2734	R20	3691	T1	7602	L25
2735	S20	3692	Q1	7603	K24
2736	R19	3693	Q1	7605	N23
2737	T19	3694	Q1	7606	N24
2738	Q19	3695	R1	7610	L22
2739	S19	3683	S14	7611	L22
2756	R31	3696	Q10	7652-A	S12
2758	S30	3697	R10	7652-B	U12
2759	X30	3701	R27	7656-A	M12
2760	Q30	3702	R27	7656-B	P12
2761	R30	3703	V27	7658-A	U13
2762	U30	3704	V27	7658-B	W13
2763	V29	3710	S24	7620	K27
2765	Q29	3711	S24	7663-A	O13
2766	U29	3712	W24	7663-B	P13
2767	R28	3708	W29	7651	P6
2768	W28	3713	W26	7640	L24
2774	W30	3714	S25	7661	M5
2775	V30	3715	S27	7641	K29
2776	V30	3716	S26	7675-A	S4
2784	Q26	3717	T25	7675-B	T4
2785	R26	3718	U25	7652	K30
2786	U26	3719	U26	7710-R	X27
2782	S31	3721	W25	7674	M9
2783	X30	3722	X25	7710-Q	V26
2787	W26	3723	X25	7681	R3
2943	W23	3730	R18	7680	S13
2941	R28	3731	S18	7701	W29
2942	S28	3724	X26	7702	S29
2944	V28	3732	T18	7711	R26
2946	V28	3725	W26	7715	X24
2951	T27	3726	V25	7720	Q20
2952	Q31	3733	R18	7721	S20
2953	S31	3727	V25	7722	R20
3101	J14	3728	W24	7724	R19
3102	K14	3734	R19	7723	T20
3103	J14	3735	T19	7725	S19
3104	J15	3736	Q19	7731	S25
3105	J14	3737	S19	7730	T27
3106	K13	3738	R20	7732	S27

9622	-	WR	WR		

B6 SSP-PART

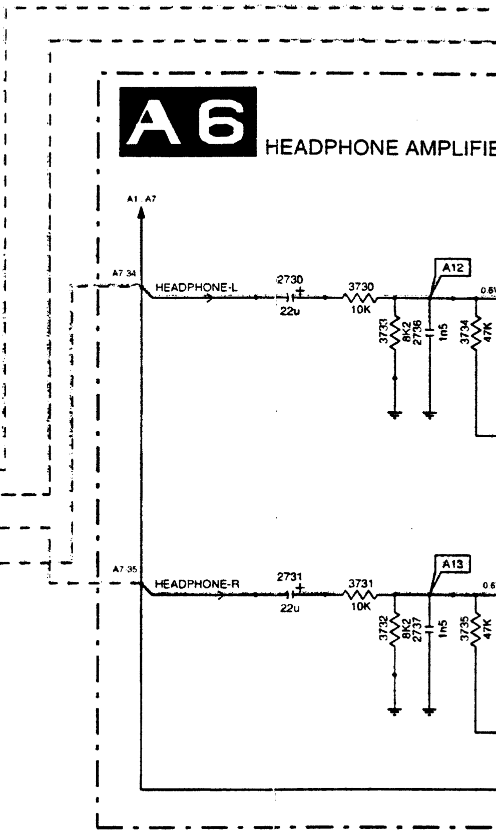
AUDIO DEMODULATOR

* COMPONENTS WITH DIVERSITY

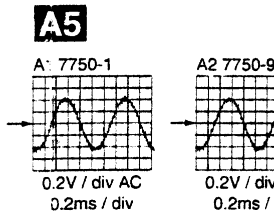

B5-147 RESET-AUDIO
B1-113 AUDIO-SW
B1-89
B1-88
SNDR-SC3-IN
SNDL-SC3-IN
CVBS-AV3-IN
(NOT USED) FROM DTV
(NOT USED)
B2 119 QSS_AM
PIP_AUDIO
PIP_AUD_IN
SNDR-SC3-IN
SNDL-SC3-IN
B5-144 SEL_IN_1
B1-94 L-SC1_AV1-IN
B1-100 R-SC1_AV1-IN
B1-105 L-FRONT-IN
B1-95 L-SC2_AV2-IN
B1-106 R-FRONT-IN
B1-96 R-SC2_AV2-IN
7651 MSP3451G
DEMODULATOR
NICAM DECODER
IDENT
DSP
14
A/D
D/A
LOUDSPEAKER
HEADPHONE
I2S INTERFACE
AUDIO PLL
SCART Switching Facilities
for MSP3410D only
for MSP3415D only
7675-A 74HC4052
7675-B 74HC4052
7652-A 74HC4052
7652-B 74HC4052
MDX
7661 BC847BW
7674 BC847BW
7681 BC847BW
7656-A BC847BS
7656-B BC847BS
7663-A BC847BS
7663-B BC847BS
7658-A BC847BS
7658-B BC847BS
7680 BC847BW
1651 CX-5F 18M432
0682 FMN
(NOT USED) FROM/TO PIP/DW
Y50 B2/B3-125
U50 B2/B3-126
V50 B2/B3-127
Y_PIP+MAIN_IN
U_PIP+MAIN_IN
V_PIP+MAIN_IN
PIP_AUD_IN
B1
B1-109 L-CL_VL OUT
B1-110 R-CL_VL-OUT
B1-114 AUDIO-L
B1-115 AUDIO-R
B1-108 HEADPHONE-R
B1-107 HEADPHONE-L
B6-149,B1-101 R-SC1_AV-OUT
B1-97,B6-150 L-SC1_AV-OUT
B5-145 SEL_IN_2
B1-99 R-SC2-OUT
B1-98 L-SC2 OUT
+5V
+5VF
+5DA
+5DB
+8V
A14
A15
A16
A17
A18
A19
A20
A21
A22
A23

A6

HEADPHONE AMPLIFIER

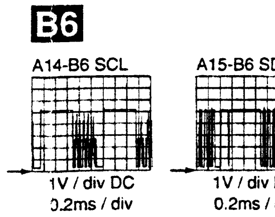

A1 A7
HEADPHONE-L
HEADPHONE-R
2730 22u
2731 22u
3730 10K
3731 10K
A12
A13

A5


A1 7750-1
0.2V / div AC
0.2ms / div

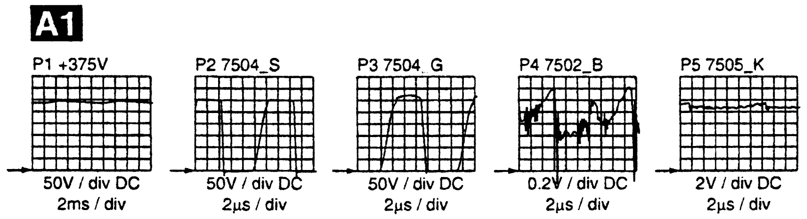
A2 7750-9
0.2V / div
0.2ms /

B6


A14-B6 SCL
1V / div DC
0.2ms / div

A15-B6 SD
1V / div
0.2ms /

A1


P1 +375V
50V / div DC
2ms / div

P2 7504_S
50V / div DC
2µs / div

P3 7504_G
50V / div DC
2µs / div

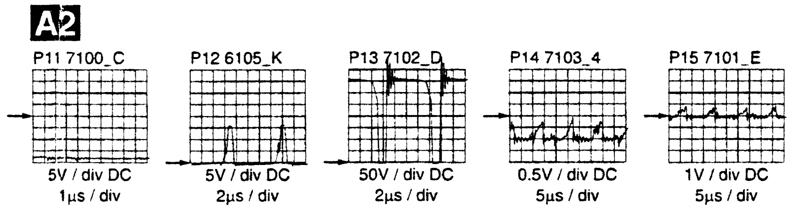
P4 7502_B
0.2V / div DC
2µs / div

P5 7505_K
2V / div DC
2µs / div

P6 VBATT=140Vdc

P7 Sound Supply =33Vdc

A2


P11 7100_C
5V / div DC
1µs / div

P12 6105_K
5V / div DC
2µs / div

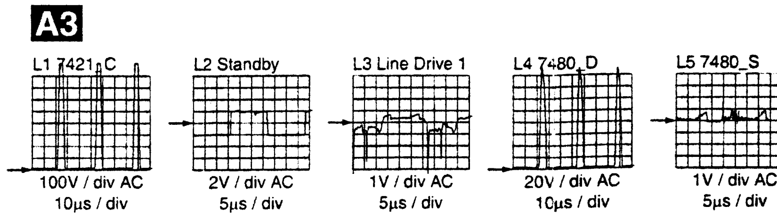
P13 7102_D
50V / div DC
2µs / div

P14 7103_4
0.5V / div DC
5µs / div

P15 7101_E
1V / div DC
5µs / div

P16 5.2V

A3


L1 7421_C
100V / div AC
10µs / div

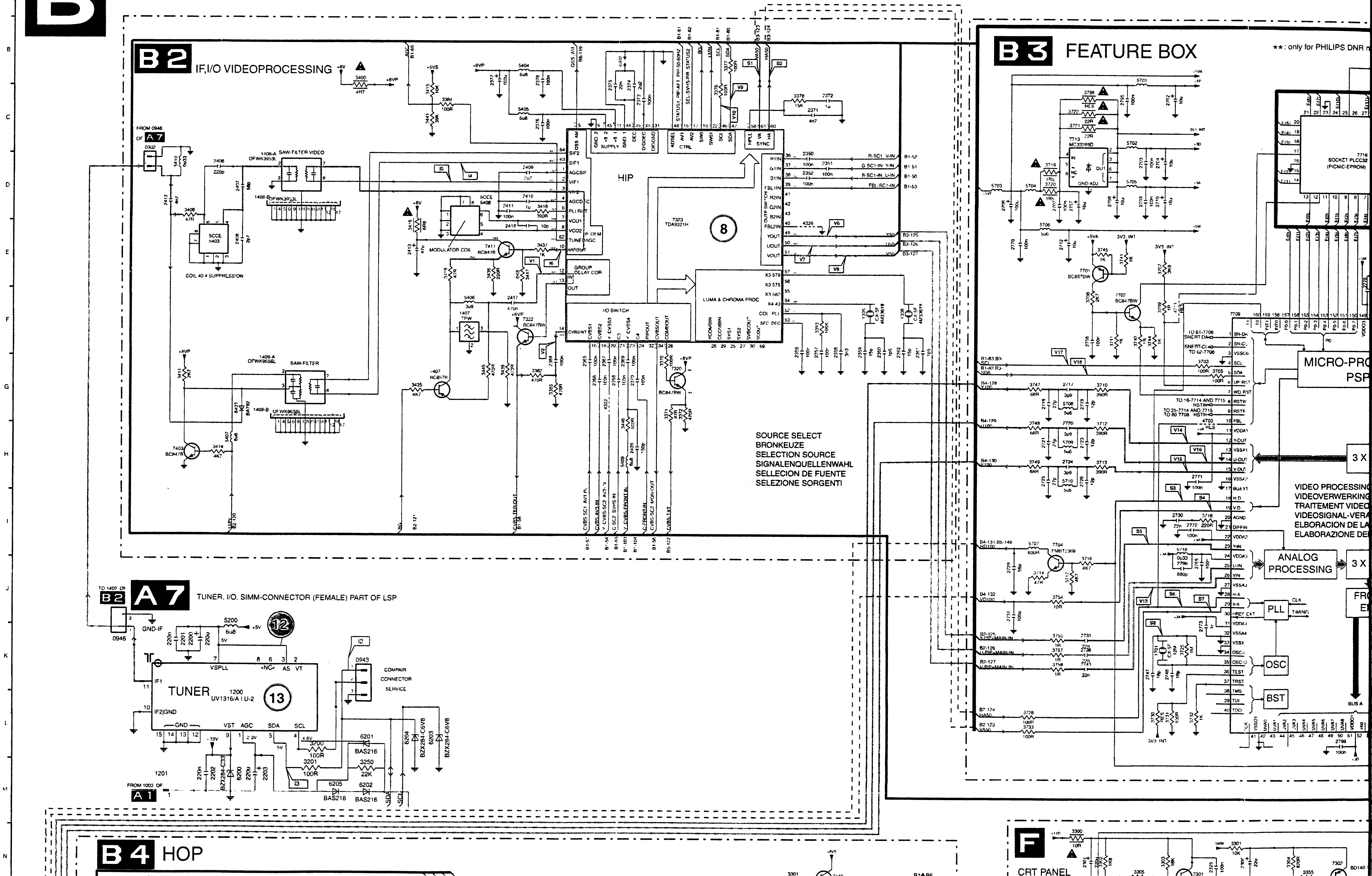
L2 Standby
2V / div AC
5µs / div

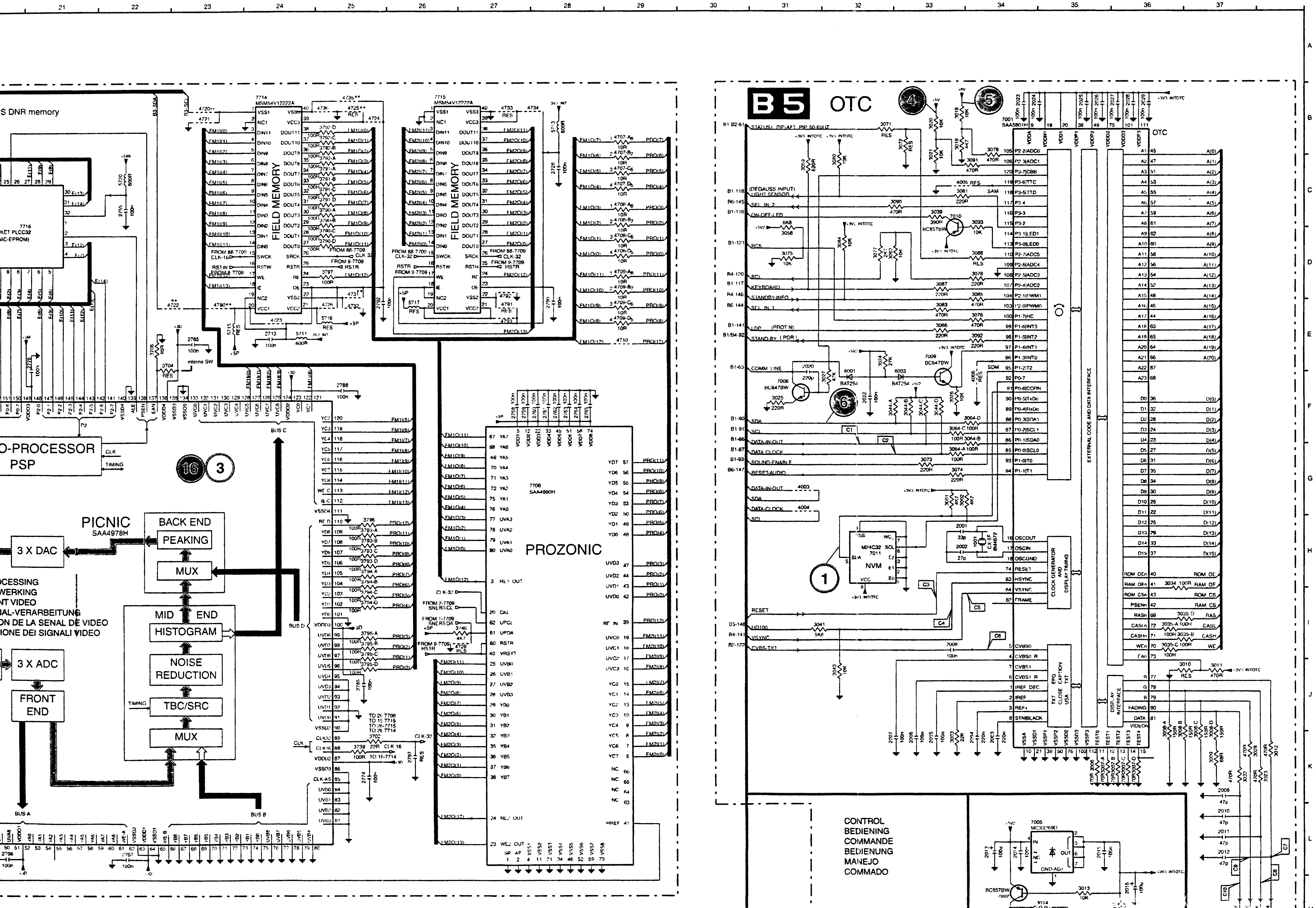
L3 Line Drive 1
1V / div AC
5µs / div

L4 7480_D
20V / div AC
10µs / div

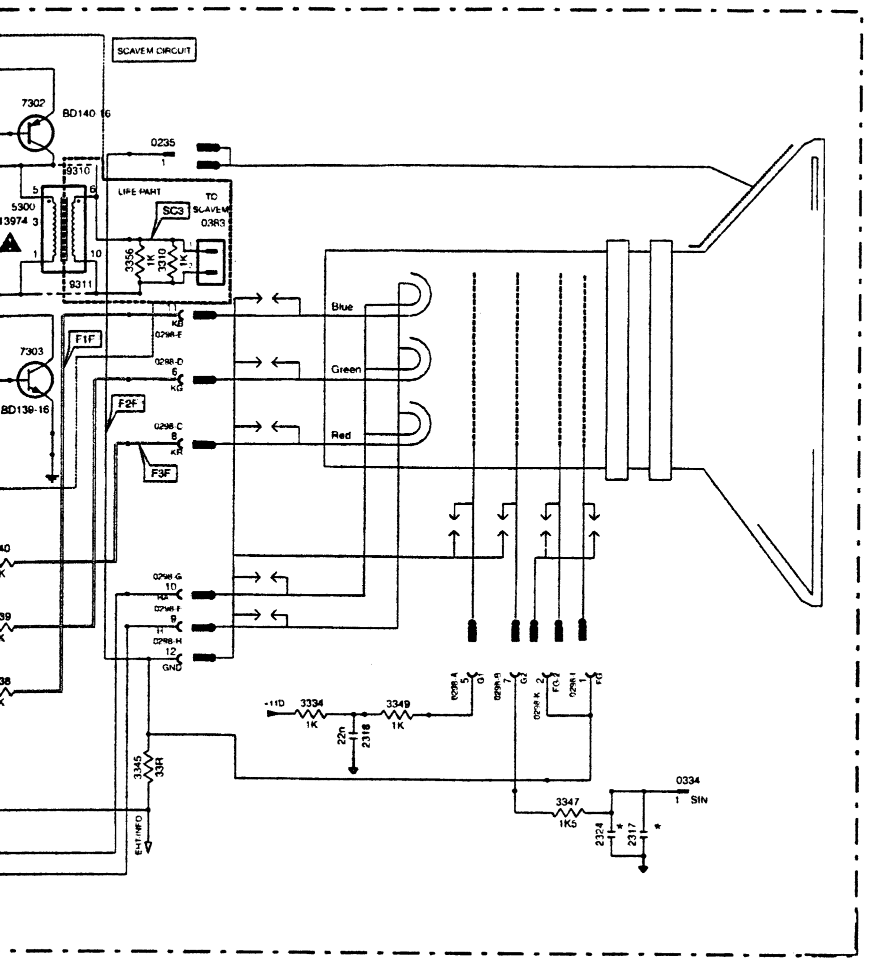
L5 7480_S
1V / div AC
5µs / div

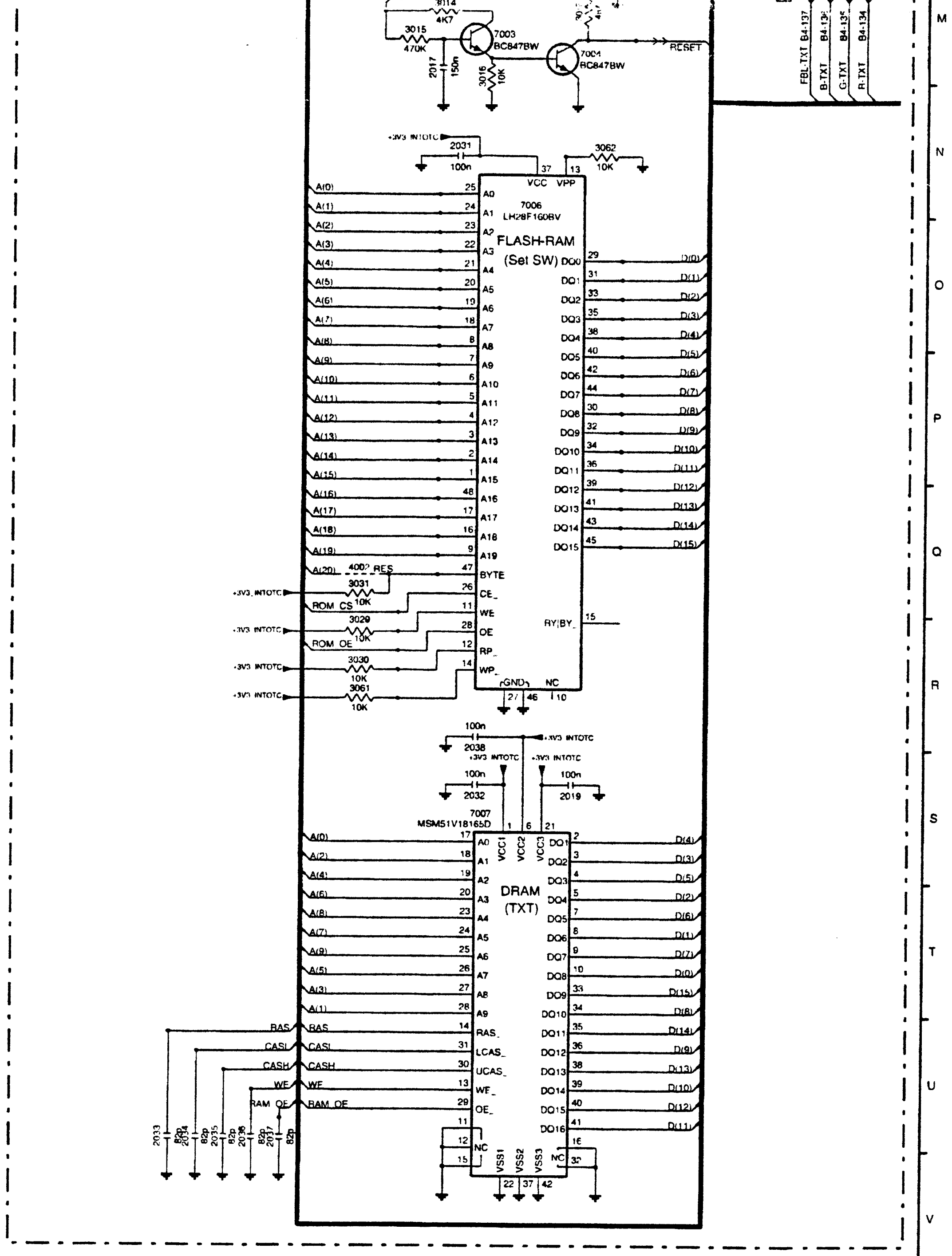
B SSP (Small Signal Panel) FOR DIAGRAM B5 SEE OTHER SIDE


B2 IF,I/O VIDEOPROCESSING
B3 FEATURE BOX
**: only for PHILIPS DNR
A7 TUNER, I/O, SIMM-CONNECTOR (FEMALE) PART OF LSP
B4 HOP
F CRT PANEL
HIP
7323 TDA9321H
8
SUPPLY
CTRL
SYNC
I/O SWITCH
LUMA & CHROMA PROC
GROUP DELAY COR
MODULATOR COIL
SAW-FILTER VIDEO
SAW-FILTER
COIL 40.4 SUPPRESSION
FROM 0946 OF A7
TO 1400 OF B2
GND-IF
TUNER 1200 UV1316/A I U-2
13
12
COMPAIR CONNECTOR SERVICE
FROM 1003 OF A1
SOURCE SELECT
BRONKEUZE
SELECTION SOURCE
SIGNALENQUELLENWAHL
SELLECION DE FUENTE
SELEZIONE SORGENTI
7716 SOCKET PLCC32 (PICNIC-EPROM)
7713 MC33269D
MICRO-PROCESSOR PSP
VIDEO PROCESSING
VIDEOVERWERKING
TRAITEMENT VIDEO
VIDEOSIGNAL-VERA
ELBORACION DE LA
ELABORAZIONE DE
ANALOG PROCESSING
PLL
OSC
BST
3 X
BUS A
CLK
TIMING


B5
OTC
S DNR memory
FIELD MEMORY
FIELD MEMORY
7714 MSM54V12222A
7715 MSM54V12222A
7716
PROZONIC
7706 SAA4990H
O-PROCESSOR PSP
PICNIC
SAA4978H
BACK END
PEAKING
MUX
MID END
HISTOGRAM
NOISE REDUCTION
TBC/SRC
MUX
3 X DAC
3 X ADC
FRONT END
BUS A
BUS B
BUS C
BUS D
CESSING
WERKING
NT VIDEO
AL-VERARBEITUNG
ON DE LA SENAL DE VIDEO
IONE DEI SIGNALI VIDEO
7001 SAA5801H
NVM
M24C32
7011
EXTERNAL CODE AND DATA INTERFACE
CLOCK GENERATOR AND DISPLAY TIMING
TXT EPG CLOSE CAPTION USA
DISPLAY INTERFACE
CONTROL
BEDIENING
COMMANDE
BEDIENUNG
MANEJO
COMMADO
7005 MC33269D
STATUS1 PIP-AF1 PIP 50-60HZ
DEGAUSS INPUT
LIGHT SENSOR
SEL IN 2
ON-OFF-LED
RC5
RC1
KEYBOARD
STANDBY-INFO
SEL IN 1
LDP (PROT N)
STAND-BY (POR)
COMM LINE
SDA
SCL
DATA-IN-OUT
DATA CLOCK
SOUND-ENABLE
RESET-AUDIO
RESET
HD100
VSYNC
CVBS-TXT

c001	T11	3001	G34	3706	E22
c002	B9	3002	G34	3707	E18
0031	R20	3003	K34	3708	F16
0224	R16	3006	K36	3709	F18
0235	N21	3007-A	K36	3710	G17
0298-A	R23	3007-B	K37	3711	F17
0298-B	R23	3007-C	K37	3712	G17
0298-C	P21	3007-D	K37	3713	H17
0298-D	P21	3008-A	J37	3714	J16
0298-E	P21	3008-B	J37	3716	I16
0298-F	Q21	3008-C	J37	3717	J16
0298-G	Q21	3008-D	J37	3718	I18
0298-H	R21	3009	K37	3719	D16
0298-I	R24	3010	J37	3720	D16
0298-K	R24	3011	J37	3721	C16
0302	C1	3012	K37	3722	C16
0334	S25	3013	M35	3725	K18
0340	O16	3014	M35	3728	L16
0383	O21	3015	M34	3730	L17
1001	H35	3016	M35	3731	L18
1301	T5	3017	M36	3732	L18
1305	F12	3018	B34	3733	L16
1308	F13	3019	B34	3739	K25
1407	F6	3020	B34	3740	F17
1408-A	C3	3021	B34	3741	E17
1408-B	D3	3023	K37	3744	F17
1409-A	F3	3024	E33	3745	E17
1409-B	G3	3025	F32	3746	I27
1701	K18	3026	F34	3747	G16
2001	H34	3027	F33	3748	G16
2002	H34	3028	K37	3749	H16
2003	K35	3029	R34	3754	J16
2004	K35	3030	R34	3755	K16
2005	K34	3031	Q34	3757	K16
2006	K34	3032	K35	3759	K16
2007	K33	3033	C35	3790-A	C25
2008	I34	3034	H37	3790-B	C25
2009	K37	3035-A	I37	3790-C	D25
2010	K37	3035-B	I37	3790-D	D25
2011	K37	3035-C	I37	3791-A	C25
2012	K37	3035-D	I38	3791-B	C25
2013	L34	3039	C34	3791-C	C25
2014	L34	3040	J33	3791-D	C25
2015	L35	3041	I32	3792-A	C25
2016	M36	3044-A	F33	3792-B	B25
2017	M34	3044-B	F34	3792-C	B25
2019	S36	3044-C	F34	3792-D	B25
2020	E32	3044-D	F34	3793-A	H25
2022	F33	3058	D32	3793-B	H25
2023	B35	3059	C32	3793-C	H25
2024	B35	3060	D33	3793-D	H25
2025	B36	3061	R34	3794-A	H25
2026	B36	3062	N36	3794-B	H25
2027	B37	3064-A	G34	3794-C	I25
2028	B37	3064-B	F35	3794-D	I25
2029	B37	3064-C	F34	3795-A	I25
2031	N35	3064-D	F35	3795-B	I25
2032	S35	3071	B33	3795-C	I25
2033	U32	3072	B34	3795-D	J25
2034	U33	3073	G34	3796	H25
2035	U33	3074	G34	3797	D25
2036	U33	3075	D32	3798	C16
2037	U33	3076	E35	4002	E39
2038	R35	3077	D33	4003	G32
2300	V11	3078	D35	4004	G32
2300	N19	3079	B35	4005	C34
2301	N16	3080	C33	4006	F35
2302	N17	3081	C34	4301	P4
2303	R9	3083	E34	4306	T4
2303	N19	3084	D33	4310	R11
2304	T8	3085	D35	4311	S13
2304	N19	3086	E34	4322	G8
2305	T8	3087	D34	4326	E11
2305	O17	3088	D35	4703	G18
2306	U10	3090	C34	4707-A	B29
2306	O17	3091	C35	4707-B	B29
2307	R4	3092	E35	4707-C	C29
2307	O19	3300	U11	4707-D	C29
2308	S9	3300	N16	4708-A	C29
2308	P17	3301	N12	4708-B	C29
2309	Q4	3301	N19	4708-C	D29
2309	P19	3302	N17	4708-D	D29
2310	Q4	3303	N18	4709-A	D29
2310	P17	3304	U12	4709-B	D29
2311	U6	3304	N20	4709-C	E29
2312	Q17	3305	N17	4709-D	E29
2313	S9	3306	R9	4710	E29
2313	R17	3306	N18	4711	F18
2314	R3	3307	R10	4720	B23
2315	R3	3307	O17	4721	B23
2315	O16	3308	R10	4722	E23
2316	R17	3308	O20	4723	E24
2317	R4	3309	R12	4724	B25
2317	S24	3309	O19	4725	B25
2318	R4	3310	Q9	4726	E25
2318	R22	3310	O21	4728	I27
2319	T3	3311	T8	4731	D25
2320	U4	3311	O17	4732	E25
2320	R18	3312	T8	4733	B27
2321	P4	3312	O18	4734	B28
2321	Q17	3313	U9	4735	B25
2322	P4	3313	O18	4736	B25
2322	R17	3314	T8	4790	E23
2323	O4	3314	O18	4791	E27
2323	R17	3315	S9	4792	D27
2324	T7	3315	O17	4793	E27
2324	S24	3316	U10	5300	O20
[illegible]	[illegible]	3316	P20	5301	[illegible]



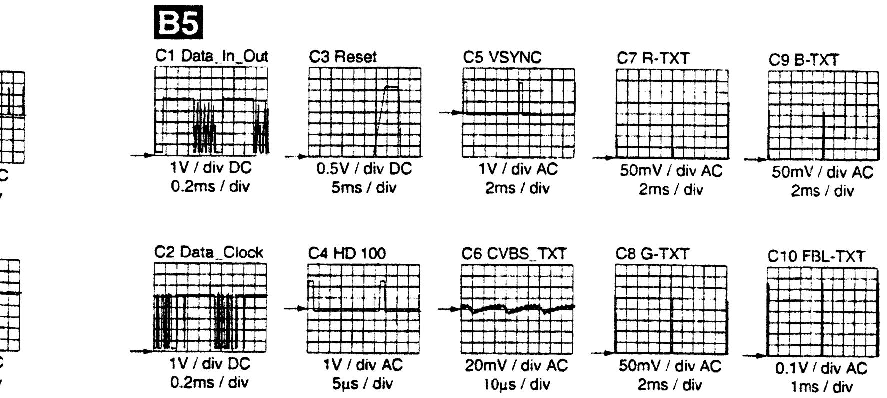


Diversity Tables

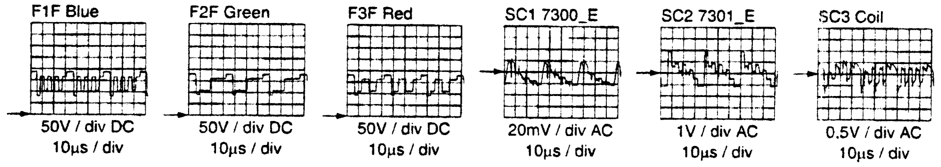
Diversity CRT-Panel (F)					
PosNr	29"	25"	28"	28" WS	32" WS
0298	-	-	-	-	SOC 9P
0298	CON 8P	CON 8P	CON 8P	CON 8P	-
0383	CON 02P	-	-	CON 02P	CON 02P
2300	22U	-	-	22U	22U
2301	220U	-	-	220U	220U
2302	3P3	-	-	3P3	3P3
2303	470P	-	-	470P	470P
2304	22N	-	-	22N	22N
2305	47U	-	-	47U	47U
2306	100N	-	-	100N	100N
2307	22N	-	-	22N	22N
2308	15P	-	-	15P	15P
2309	22N	-	-	22N	22N
2310	18P	-	-	18P	18P
2312	22P	-	-	22P	22P
2317	4N7	4N7	4N7	4N7	-
2317	4N7	4N7	4N7	4N7	-
2321	-	68P	68P	-	-
2322	-	82P	82P	-	-
2323	-	56P	56P	-	-
2324	-	-	-	-	820P
2325	100N	-	-	100N	100N
3300	FUSE 10R	-	-	FUSE 10R	FUSE 10R
3301	3W 10K	-	-	3W 10K	3W 10K
3302	1K8	-	-	1K8	1K8
3303	18K	-	-	18K	18K
3304	820R	-	-	820R	820R
3305	330R	-	-	330R	330R
3306	4R7	-	-	4R7	4R7
3307	10R	-	-	10R	10R
3308	56K	-	-	56K	56K
3309	150R	-	-	150R	150R
3310	1K	-	-	1K	1K
3311	100R	-	-	100R	100R
3312	2K2	-	-	2K2	2K2
3313	220R	-	-	220R	220R
3314	220R	-	-	220R	220R
3315	1K5	-	-	1K5	1K5
3316	56K	-	-	56K	56K
3317	1K2	-	-	1K2	1K2
3318	15R	-	-	15R	15R
3319	820R	-	-	820R	820R
3320	1K	-	-	1K	1K
3335	100R	-	-	100R	100R
3335	-	1K	1K	-	-
3336	100R	-	-	100R	100R
3336	-	1K	1K	-	-
3337	100R	-	-	100R	100R
3337	-	1K	1K	-	-
3355	4R7	-	-	4R7	4R7
3356	1K	-	-	1K	1K
3357	4R7	-	-	4R7	4R7
5300	TFM	-	-	TFM	TFM
7300	SIGF199	-	-	SIGF199	SIGF199
7301	SIGF370	-	-	SIGF370	SIGF370
7302	TRA POW	-	-	TRA POW	TRA POW
7303	TRA POW	-	-	TRA POW	TRA POW
9305	WR	-	-	WR	WR
9308	WR	-	-	WR	WR
9309	WR	-	-	WR	WR
9312	WR	-	-	WR	WR
9313	WR	-	-	WR	WR
9424	-	-	-	-	WR

Diversity Small Signal Panel (B3)			
Item	100HZ INCR ST	DS VIRT DLB	100HZ DLB
2728	-	100N	-
2758	-	100N	-
2759	-	100N	-
2760	-	100N	-
2761	-	100N	-
2762	-	100N	-
2763	-	100N	-
2764	-	100N	-
2765	-	100N	-
2790	-	100N	-
3793	10R	100R	10R
3794	10R	100R	10R
3795	10R	100R	10R
3796	10R	100R	10R
4707	10R	-	10R
4708	10R	-	10R
4709	10R	-	10R
4710	JUMP	-	JUMP
4734	-	JUMP	-
4792	-	JUMP	-
4793	-	JUMP	-
5713	-	FXDIND	-
7708	-	SAA4990H	-
7715	-	MSM54V12222A-30JS	-

B5



F



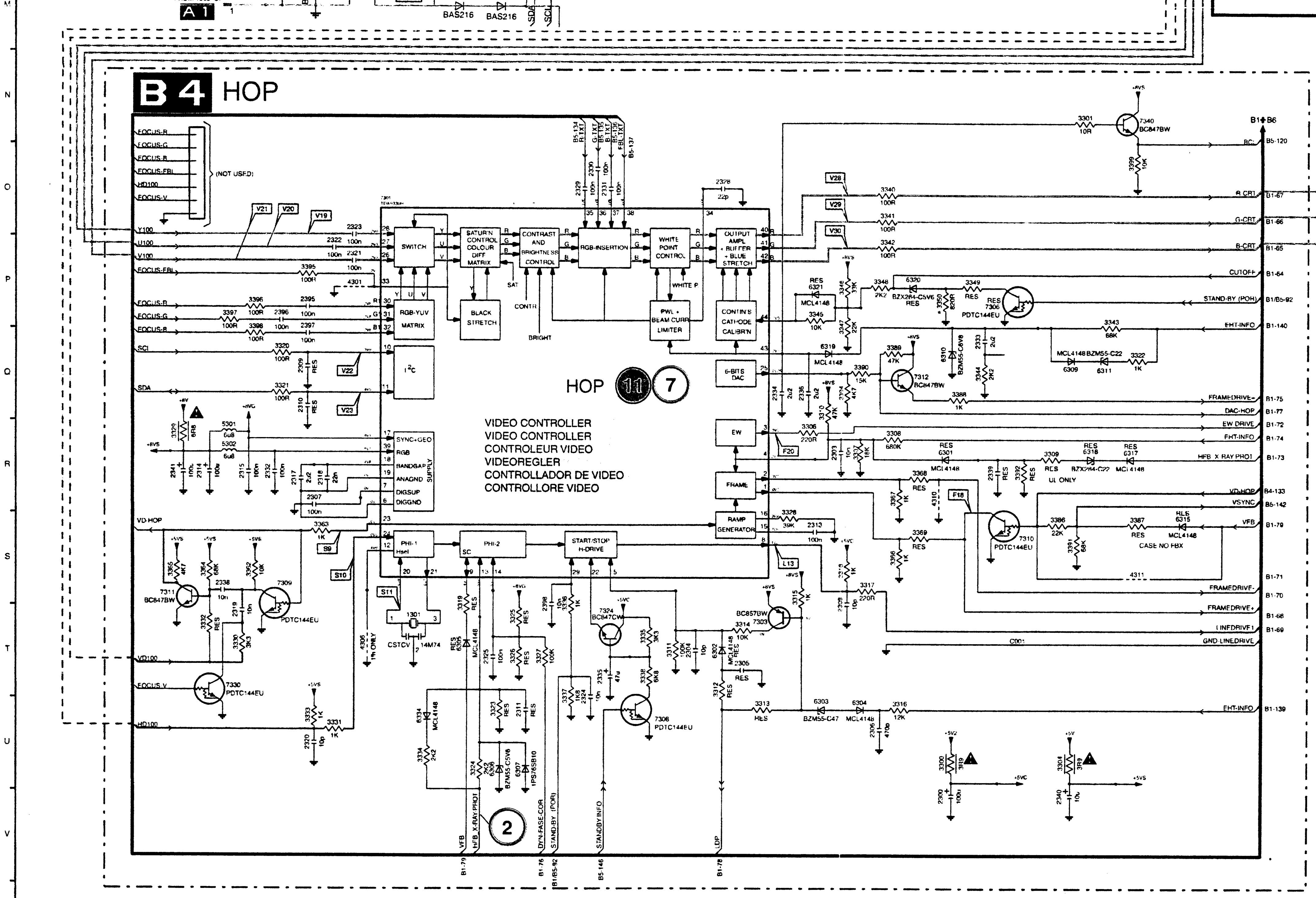
—— IF, CVAS, RGB

● PROTECTION ERROR

○ NON-PROTECTION ERROR

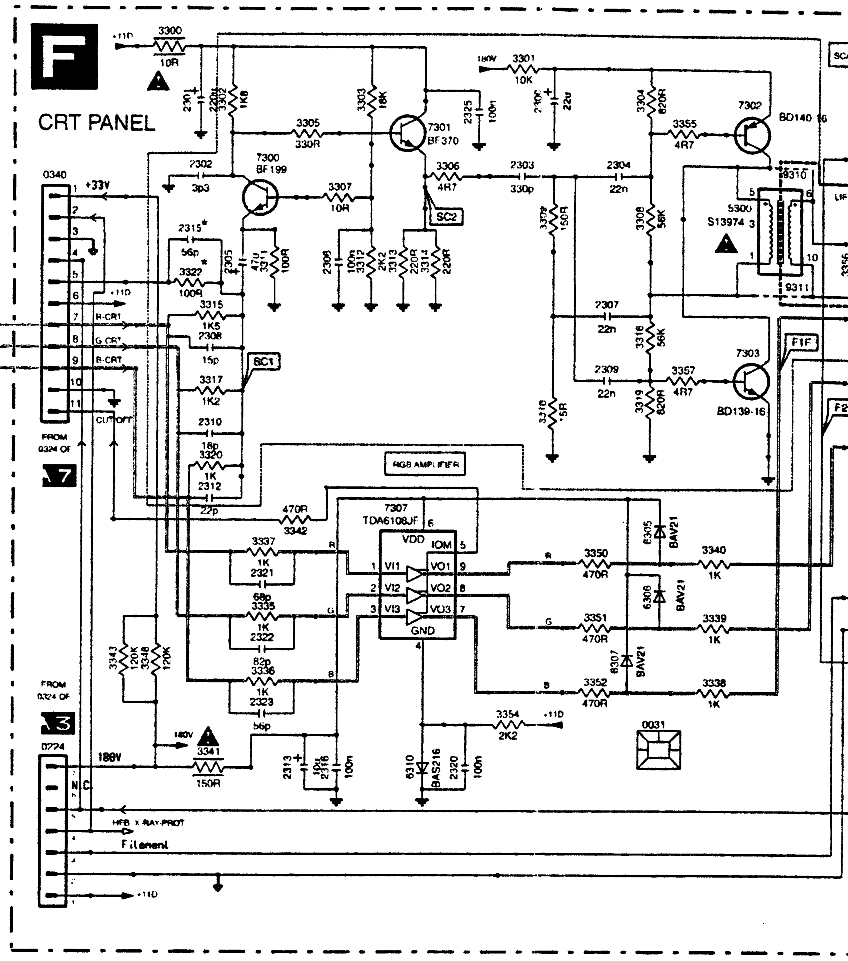
[illegible]	[illegible]	3316	P20	5301	[illegible]
2325	N18	3317	S10	5302	R3
2328	O8	3317	P17	5403	E2
2329	O7	3318	S9	5404	B7
2330	O7	3318	P19	5405	C7
2331	O7	3319	S5	5406	F6
2332	R3	3319	P20	5407	H3
2333	Q11	3320	Q3	5408	D6
2334	Q9	3320	P17	5409	H9
2335	T7	3321	Q3	5410	D2
2336	Q9	3322	Q13	5701	B17
2338	S3	3322	O16	5702	C17
2339	R11	3323	U6	5703	D15
2340	V12	3324	U5	5704	D16
2341	R2	3325	T6	5705	D17
2350	D11	3326	T6	5706	E16
2351	D12	3327	T6	5707	I16
2352	D11	3328	R9	5708	G16
2356	F11	3329	R2	5709	H16
2357	F11	3330	T3	5710	H16
2358	F12	3331	U4	5711	E24
2359	F12	3332	T3	5713	B28
2360	F12	3333	U4	5715	E23
2361	F13	3334	U5	5716	E25
2362	F13	3334	R22	5717	E26
2365	G8	3335	T7	5718	I18
2366	G8	3335	Q17	5720	C22
2367	G8	3336	S6	6001	F33
2368	G8	3336	R17	6003	F34
2369	G9	3337	T6	6301	R11
2370	G9	3337	Q17	6302	T8
2371	C11	3338	T7	6303	U9
2372	C12	3338	R20	6304	U10
2373	C9	3339	Q20	6305	T5
2374	B9	3340	O10	6305	Q20
2375	B8	3340	Q20	6306	U6
2376	C7	3341	O10	6306	Q20
2377	B7	3341	R17	6307	U6
2378	B7	3342	P10	6307	R19
2384	G8	3342	Q17	6309	Q12
2395	P4	3343	P12	6310	Q11
2396	P3	3343	R16	6310	R18
2397	P4	3344	Q11	6311	Q12
2398	S6	3345	P9	6315	S13
2406	D3	3345	R21	6317	R13
2407	D3	3346	P9	6318	R12
2408	E3	3347	P9	6319	Q9
2409	D7	3347	S24	6320	P10
2410	D7	3348	P10	6321	P9
2411	D7	3348	R16	6334	U5
2412	D2	3349	P11	6403	G3
2413	E5	3349	R23	7001	B35
2417	F7	3350	P11	7002	M34
2418	E7	3350	Q19	7003	M35
2420	H9	3351	Q19	7004	M35
2702	C18	3352	R19	7005	L34
2703	D17	3354	R19	7006	N35
2704	D15	3355	N20	7007	S35
2706	D15	3356	O21	7008	F32
2707	D16	3357	P20	7009	E34
2708	D17	3362	S3	7010	C34
2709	D17	3363	S4	7011	H33
2710	D18	3364	S3	7300	N17
2712	E16	3365	S2	7301	O4
2713	E24	3366	S10	7301	N18
2717	G16	3367	R10	7302	N20
2718	G16	3368	R10	7303	T9
2719	G16	3369	S10	7303	P20
2720	G16	3370	G9	7306	P11
2721	H16	3371	G9	7307	Q18
2723	H16	3372	G9	7308	U7
2724	H16	3376	C10	7309	S4
2725	H16	3377	B10	7310	S12
2726	H16	3378	C11	7311	S2
2728	C28	3382	G7	7312	O10
2729	J15	3384	C6	7320	G9
2730	I18	3385	G8	7322	F7
2731	J15	3386	S12	7323	D9
2733	K16	3387	S13	7324	T7
2738	K16	3388	O11	7330	T3
2743	K16	3389	Q10	7340	N13
2747	K17	3390	Q10	7403	H2
2748	K18	3391	S12	7407	G6
2755	C22	3392	R11	7411	E7
2756	F16	3393	F11	7701	E16
2757	D16	3394	Q9	7702	F17
2758	F27	3395	P4	7704	I16
2759	F27	3396	P3	7708	G27
2760	F28	3397	P3	7709	F19
2761	F28	3398	P3	7713	C16
2762	F28	3399	O13	7714	B24
2763	F28	3400	B5	7715	B26
2764	F28	3406	D2	7716	C21
2765	F28	3411	G2	9310	N20
2766	J18	3414	H3	9311	O21
2767	L22	3415	C6		
2770	E15	3416	E5		
2771	H18	3417	E7		
2772	I18	3418	D7		
2773	J18	3419	E6		
2774	K25	3435	G6		
2776	E21	3436	E7		
2785	E23	3437	E7		
2786	J25	3439	G7		
2788	F25	3441	C6		
2790	E28	3445	G7		
2792	E25	3446	G9		
2795	C17	3702	K25		
2796	L20	3703	G18		
2797	K26	3704	E22		
2798	J18	3705	G18		

CL 96532156_092.eps
140400

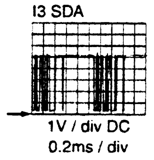

A1
BAS216
BAS216
SDA
SCL
B4 HOP
FOCUS-R
FOCUS-G
FOCUS-B
FOCUS-FBL
HD100
FOCUS-V
(NOT USED)
Y100
U100
V100
FOCUS-FBL
FOCUS-R
FOCUS-G
FOCUS-B
SCl
SDA
VD-HOP
VD100
FOCUS-V
HD100
V21
V20
V19
V22
V23
S9
S10
S11
SWITCH
SATUR'N CONTROL COLOUR DIFF MATRIX
CONTRAST AND BRIGHTNESS CONTROL
RGB-INSERTION
WHITE POINT CONTROL
OUTPUT AMPL + BUFFER + BLUE STRETCH
RGB-YUV MATRIX
BLACK STRETCH
PWL + BEAM CURR LIMITER
CONTIN'S CATHODE CALIBR'N
I²C
6-BITS DAC
EW
FRAME
RAMP GENERATOR
SYNC+GEO
RGB
BANDGAP
ANAGND
DIGSUP
DIGGND
SUPPLY
PHI-1
PHI-2
START/STOP H-DRIVE
CONTR
BRIGHT
WHITE P
SAT
HOP 11 7
VIDEO CONTROLLER
VIDEO CONTROLLER
CONTROLEUR VIDEO
VIDEOREGLER
CONTROLADOR DE VIDEO
CONTROLLORE VIDEO
2
B1÷B6
BC
R-CRT
G-CRT
B-CRT
CUTOFF
STAND-BY (POR)
EHT-INFO
FRAMEDRIVE-
DAC-HOP
EW DRIVE
EHT-INFO
HFB_X-RAY PROT
VD-HOP
VSYNC
VFB
FRAMEDRIVE-
FRAMEDRIVE+
LINEDRIVE1
GND LINEDRIVE
EHT-INFO
B5-120
B1-67
B1-66
B1-65
B1-64
B1/B5-92
B1-140
B1-75
B1-77
B1-72
B1-74
B1-73
B4-133
B5-142
B1-79
B1-71
B1-70
B1-68
B1-69
B1-139
V28
V29
V30
F18
F20
L13
7340 BC847BW
7312 BC847BW
7306 PDTC144EU
7310 PDTC144EU
7311 BC847BW
7309 PDTC144EU
7330 PDTC144EU
7324 BC847CW
7303 BC857BW
7308 PDTC144EU
1301 CSTCV 14M74
CASE NO FBX
UL ONLY
VFB
HFB_X-RAY PROT
DYN-FASE-COR
STAND-BY (POR)
STANDBY INFO
LDP
B1-79
B1-76
B1/B5-92
B5-146
B1-78

F

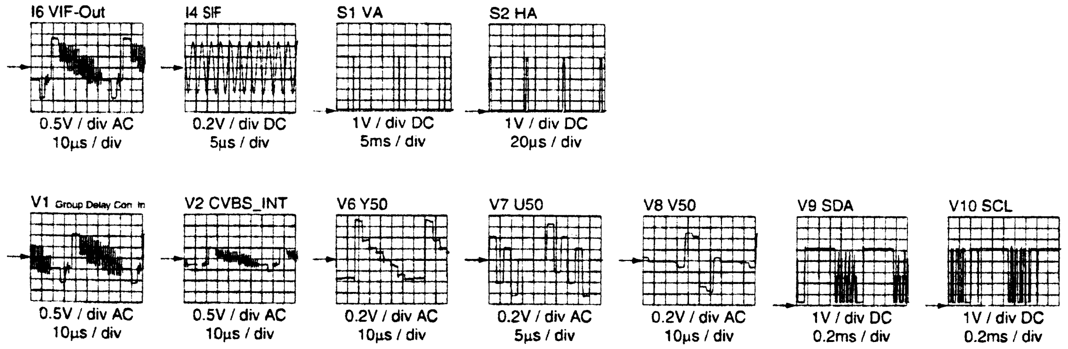
CRT PANEL


CRT PANEL
0340
FROM 0324 OF
7
FROM 0324 OF
3
0224
7300 BF199
7301 BF370
7302 BD140
7303 BD139-16
7307 TDA6108JF
RGB AMPLIFIER
VDD
IOM
VI1
VI2
VI3
VO1
VO2
VO3
GND
BAV21
BAS216
5300 S13974
9310
9311
SC1
SC2
F1F
R-CRT
G-CRT
B-CRT
CUTOFF
+33V
+11D
180V
HFB_X-RAY-PROT
Filament
0031

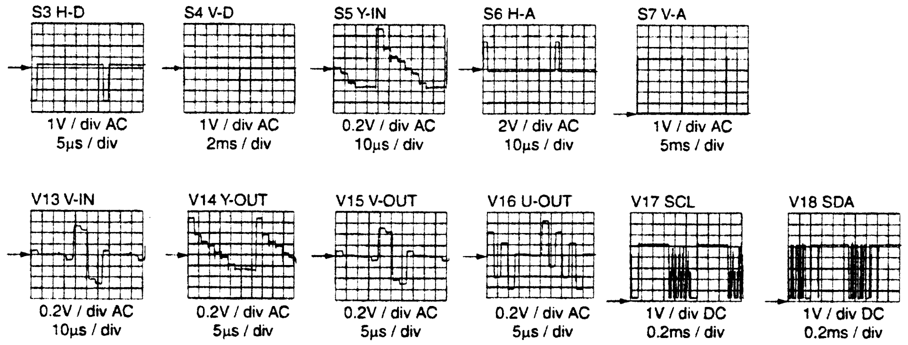
A7



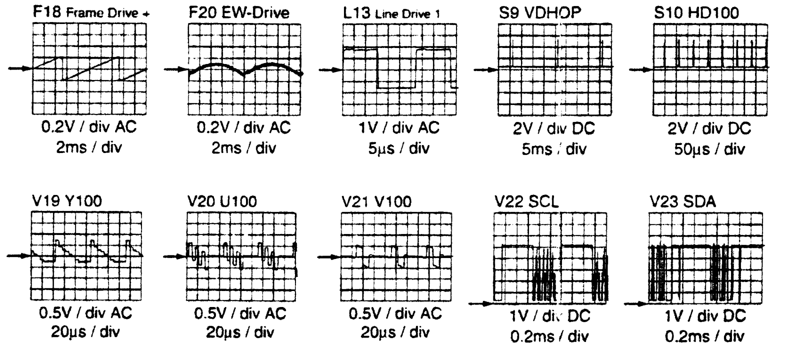
B2



B3



B4



Colour Television **Chassis**

EM2E

AA 02.01

Service
Service
Service

Service Information

GB Changes in Course of Production

INTRODUCTION ANTI-MOIRÉ PANEL
From production start onwards, an anti-moiré panel was introduced in the 29" 4:3 Real Flat sets with Philips CRT. This anti-moiré circuitry is combined with the DC-shift panel (assy 12nc is 3104 328 16661).

Involved sets:
- 29PT9007.
- 29PT9047.

Circuit diagram (G), layouts and partslist are published.

INTRODUCTION OF NEW SSB PANEL
During production, a new SSB panel is introduced. The layout of the copper pattern has been changed to version 8. Below, you will find the most important changes.

Diagram B4 (HOP):
- A new dimensioning of the HOP slow-start circuit (items 3335, 3338 and 2335).
- A new flash circuit (items 6313 and 6314 are added) around the HOP (diagram B4).

Diagram B5 (OTC):
- A new flash reset circuitry is added, to prevent NVM overwriting.
- To solve TXT-jitter, two transistors (7012 and 7013) were added, to improve the steepness of the H_{SYNC} and V_{SYNC} pulses. This change is implemented together with new software.

Circuit diagrams (B4 and B5), layouts and partslist are published.

D Änderungen bei der Produktion

EINFÜHRUNG DES ANTI-MOIRÉ-PANELS
Seit Beginn der Produktion enthalten die 29" 4:3 Real Flat Geräte mit Philips Kathodenstrahlröhre ein Anti-Moiré Panel. Diese Anti-Moiré Schaltung wird mit dem Gleichstromänderungs-Panel (Assy 12nc ist 3104 328 16661) kombiniert.

Betroffene Geräte:
- 29PT9007.
- 29PT9047.

Der Schaltplan (G), die Layouts und die Teileliste wurden veröffentlicht.

EINFÜHRUNG DES NEUEN SSB-PANELS
Während der Produktion wird das neue Klein Signal Platine (SSB-Panel) eingeführt. Das Layout der Kupferstruktur wurde zu Version 8 geändert. Nachstehend werden die wichtigsten Änderungen beschrieben

Schaltplan B4 (HOP):
- Eine neue Dimension von HOP Slow Start Schaltungen (Teile 3335, 3338 und 2335).
- Eine neue Flash-Schaltung um den HOP (Teile 6313 und 6314 werden hinzugefügt). (Schaltplan B4)

Schaltplan B5 (OTC):
- Es wird eine neue Rückstell Schaltung für den Flash-Speicher hinzugefügt, um das Überschreiben des nicht-flüchtigen Speichers zu verhindern.
- Um TXT-Bildschwankungen zu beheben, wurden zur Verbesserung der Steilheit der Impulse HSYNC und VSYNC zwei Transistoren (7012 und 7013) hinzugefügt. Diese Änderung wird zusammen mit neuer Software implementiert.

Die Schaltpläne (B4 und B5), die Layouts und die Teileliste wurden veröffentlicht.

©Copyright 2002 Philips Consumer Electronics B.V. Eindhoven, The Netherlands. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by JA 0262 Service PaCE Printed in the Netherlands Subject to modification 3122 785 40590

PHILIPS

Ⓕ Modifications en cours de production

INTRODUCTION D'UNE PLATINE ANTI-MOIRÉ
Une platine anti-moiré a été introduite dans les postes 4:3 Real Flat de 29" équipés d'un tube cathodique Philips depuis le début de la production. Ce circuit anti-moiré est combiné à la platine à décalage CC réglable (réf. 12nc 3104 328 16661).

Postes concernés :
- 29PT9007.
- 29PT9047.

Les schémas de câblage, tracés et listes de pièces correspondants sont publiés.

INTRODUCTION D'UNE NOUVELLE PLATINE PETITS SIGNAUX
Une nouvelle platine petits signaux (SSB) a été introduite au cours de la production. Le tracé des pistes de cuivre a été modifié et correspond maintenant à la version 8. Les plus importantes modifications sont notées ci-dessous.

Schéma B4 (HOP)
- Le circuit HOP à démarrage lent a été redimensionné (éléments 3335, 3338 et 2335).
- Un nouveau circuit flash (les éléments 6313 et 6314 ont été ajoutés) a été disposé autour du processeur HOP (schéma B4).

Schéma B5 (OTC)
- Un nouveau circuit de réinitialisation flash a été ajouté afin d'empêcher l'écrasement de la mémoire non volatile (NVM).
- Pour résoudre le problème d'instabilité horizontale de l'image texte, deux transistors (7012 et 7013) ont été ajoutés afin d'améliorer la raideur des impulsions HSYNC et VSYNC. Cette modification est mise en œuvre conjointement avec le nouveau logiciel.

Les schémas de câblage (B4 et B5), tracés et listes de pièces correspondants sont publiés.

Ⓔ Cambios durante la producción

INTRODUCCIÓN DEL PANEL ANTI-MOIRÉ
Desde que se ha iniciado la producción, se ha introducido un panel anti-moiré en los equipos de 29" 4:3 Real Flat con TRC de Philips. Esta circuitería anti-moiré se combina con el panel de desplazamiento de C.C. (el código 12NC del conjunto es 3104 328 16661).

Equipos implicados:
- 29PT9007.
- 29PT9047.

Se publican el diagrama de circuitos (G), esquemas y listas de piezas.

INTRODUCCIÓN DEL NUEVO PANEL SSB
Durante la producción, se ha introducido un nuevo panel SSB. El esquema del patrón de pistas de cobre ha cambiado a la versión 8. A continuación encontrará los cambios más importantes.

Diagrama B4 (HOP):
- Nuevo dimensionamiento de la circuitería de arranque lento del HOP (elementos 3335, 3338 y 2335).
- Nuevo circuito flash (se agregan los elementos 6313 y 6314) alrededor del HOP (diagrama B4).

Diagrama B5 (OTC):
- Se ha agregado una nueva circuitería flash de reset para evitar la sobrescritura de la NVM.
- Para solucionar el problema del temblor (jitter) de TXT, se han agregado dos transistores (7012 y 7013) para mejorar la pendiente de los pulsos HSYNC y VSYNC. Este cambio se ha implantado conjuntamente con el nuevo software.

Se publican los diagramas (B4 y B5), esquemas y listas de piezas.

(I) Modifiche in corso di produzione

INRODUZIONE DI UN PANNELLO ANTI-MOIRÉ
A partire dalla produzione in poi, è stato introdotto un pannello anti-moiré negli apparecchi 29" 4:3 Real Flat con CRT Philips. Questo circuito anti-moiré è associato ad un pannello di deviazione in C.C. (l'assemblaggio 12nc è 3104 328 16661).

Apparecchi interessati:
- 29PT9007.
- 29PT9047.

Schemi dei circuiti (G), layout ed elenco parti di ricambio sono pubblicati.

INTRODUZIONE DEL NUOVO PANNELLO SSB
Durante la produzione, viene introdotto un nuovo pannello SSB. Il layout del modello in rame è stato cambiato nella versione 8. Qui di seguito vengono elencate le modifiche più importanti.

Schema B4 (HOP):
- Nuovo dimensionamento del circuito HOP ad avvio ritardato (art. 3335, 3338 e 2335).
- Nuovo circuito flash (aggiunti gli art. 6313 e 6314) attorno all' HOP (schema B4).

Schema B5 (OTC):
- È stato aggiunto un nuovo circuito di flash reset per impedire la sovrascrittura NVM.
- Per risolvere il tremolio TXT, sono stati aggiunti due transistori (7012 e 7013), in modo da migliorare la ripidezza degli impulsi HSYNC e VSYNC. Questa modifica è stata implementata assieme al nuovo software.

Schemi del circuiti (B4 e B5), layout ed elenco parti di ricambio sono pubblicati.

Spare Parts List

Small Signal Panel [B]

Various

0302	2422 025 16542	CON 2P Male
1001	2422 543 89022	XTL 6MHz 20pF
1301	2422 540 98456	CER RES 12MHz
1305	2422 543 01184	XTL 4M433619 20pF
1308	2422 543 01158	XTL 3M579545 7pF
1407	2422 549 44324	FIL CER 5M5/5M74
1408	2422 549 44372	FIL SAW 38.9MHz OFWK3953L
1409	2422 549 44369	FIL SAW 38.9MHz OFWK9656L
1651	2422 543 89019	XTL 18M432 12pF
1701	2422 543 89018	XTL 12MHz 20pF

⊣⊢

2001	2222 867 15339	33pF 5% 50V
2002	4822 126 11669	27pF
2003	4822 126 13879	220nF 20% 16V
2004	4822 126 13879	220nF 20% 16V
2005	4822 126 14305	100nF 10% 16V
2006	4822 126 14305	100nF 10% 16V
2007	4822 126 14305	100nF 10% 16V
2008	4822 126 14305	100nF 10% 16V
2010	4822 122 33777	47pF 5% 63V
2011	4822 122 33777	47pF 5% 63V
2012	4822 122 33777	47pF 5% 63V
2013	4822 124 12095	100µF 20% 16V
2014	4822 126 14305	100nF 10% 16V
2015	4822 126 14305	100nF 10% 16V
2016	2020 021 91557	100µF 20% 16V
2017	4822 126 14305	100nF 10% 16V
2019	4822 126 14305	100nF 10% 16V
2020	4822 126 13883	220pF 5% 50V
2022	4822 126 14305	100nF 10% 16V
2023	4822 126 14305	100nF 10% 16V
2024	4822 126 14305	100nF 10% 16V
2025	4822 126 14305	100nF 10% 16V
2026	4822 126 14305	100nF 10% 16V
2027	4822 126 14305	100nF 10% 16V
2028	4822 126 14305	100nF 10% 16V
2029	4822 126 14305	100nF 10% 16V
2031	4822 126 14305	100nF 10% 16V
2032	4822 126 14305	100nF 10% 16V
2033	4822 126 14226	82pF 5% 50V
2034	4822 126 14226	82pF 5% 50V
2035	4822 126 14226	82pF 5% 50V
2036	4822 126 14226	82pF 5% 50V
2037	4822 126 14226	82pF 5% 50V
2038	4822 126 14305	100nF 10% 16V
2039	4822 126 14305	100nF 10% 16V
2300	4822 124 12095	100µF 20% 16V
2303	5322 126 11583	10nF 10% 50V
2304	4822 122 33741	10pF 10% 50V
2306	4822 126 13881	470pF 5% 50V
2307	4822 126 14305	100nF 10% 16V
2308	4822 122 33741	10pF 10% 50V
2313	4822 121 70159	0.1µF 16V
2314	4822 124 12095	100µF 20% 16V
2315	4822 126 14305	100nF 10% 16V
2317	4822 126 14491	2.2µF 10V
2318	4822 126 14494	22nF 10% 25V
2319	5322 126 11583	10nF 10% 50V
2320	4822 122 33741	10pF 10% 50V
2321	4822 126 14305	100nF 10% 16V
2322	4822 126 14305	100nF 10% 16V
2323	4822 126 14305	100nF 10% 16V
2324	5322 126 11583	10nF 10% 50V
2325	4822 126 14305	100nF 10% 16V
2328	4822 122 33761	22pF 5% 50V
2329	4822 126 14305	100nF 10% 16V
2330	4822 126 14305	100nF 10% 16V
2331	4822 126 14305	100nF 10% 16V
2332	4822 126 14305	100nF 10% 16V
2333	4822 126 14491	2.2µF 10V
2334	4822 126 14491	2.2µF 10V
2335	4822 124 12095	100µF 20% 16V
2336	4822 126 14491	2.2µF 10V
2338	5322 126 11583	10nF 10% 50V
2340	4822 124 23002	10µF 16V
2341	4822 124 12095	100µF 20% 16V
2350	4822 126 14305	100nF 10% 16V
2351	4822 126 14305	100nF 10% 16V
2352	4822 126 14305	100nF 10% 16V
2356	4822 126 14305	100nF 10% 16V
2357	4822 126 14305	100nF 10% 16V
2358	5322 126 11579	3.3nF 10% 63V
2359	4822 122 33752	15pF 5% 50V
2360	3198 016 33380	3.3pF 50V
2361	3198 016 31580	1.5pF 50V
2362	4822 126 11663	12pF
2365	4822 126 14305	100nF 10% 16V
2366	4822 126 14305	100nF 10% 16V
2367	4822 126 14305	100nF 10% 16V
2368	4822 126 14305	100nF 10% 16V
2369	4822 126 14305	100nF 10% 16V
2370	4822 126 14305	100nF 10% 16V
2371	4822 126 13193	4.7nF 10% 63V
2372	4822 126 14043	1µF 20% 16V
2373	4822 126 14305	100nF 10% 16V
2374	4822 126 14491	2.2µF 10V
2375	4822 126 14494	22nF 10% 25V
2376	4822 126 14305	100nF 10% 16V
2377	4822 124 12095	100µF 20% 16V
2378	4822 126 14305	100nF 10% 16V
2384	4822 126 14305	100nF 10% 16V
2406	4822 126 13883	220pF 5% 50V
2407	4822 126 13956	68pF 5% 63V
2408	3198 016 32780	2.7pF 50V
2409	4822 126 14491	2.2µF 10V
2410	4822 126 14472	1µF 10% 10V
2411	4822 126 14305	100nF 10% 16V
2412	4822 126 13193	4.7nF 10% 63V
2413	4822 124 80151	47µF 16V
2417	3198 017 44740	0603 10V 470nF
2418	4822 126 13956	68pF 5% 63V
2420	4822 122 33753	150pF 5% 50V
2501	4822 122 33777	47pF 5% 63V
2502	4822 122 32927	220nF 20% 50V
2503	4822 122 32927	220nF 20% 50V
2504	4822 122 32927	220nF 20% 50V
2505	4822 122 32927	220nF 20% 50V
2508	2020 021 91557	100µF 20% 16V
2546	4822 124 23002	10µF 16V
2547	4822 124 23002	10µF 16V
2548	4822 124 23002	10µF 16V
2549	4822 124 23002	10µF 16V
2550	4822 126 14241	330pF 50V
2551	5322 126 11579	3.3nF 10% 63V
2609	3198 016 31020	1nF 25V
2610	4822 126 14238	2.2nF 50V
2611	5322 126 11578	1nF 10% 50V
2629	4822 122 32927	220nF 20% 50V
2637	4822 122 32927	220nF 20% 50V
2640	4822 126 13879	220nF 20% 16V
2651	4822 126 14305	100nF 10% 16V
2652	4822 122 33777	47pF 5% 63V
2653	4822 122 32927	220nF 20% 50V
2654	4822 126 13881	470pF 5% 50V
2655	4822 126 13881	470pF 5% 50V
2656	4822 126 13881	470pF 5% 50V
2657	4822 126 13881	470pF 5% 50V
2658	4822 126 13881	470pF 5% 50V
2661	4822 122 32927	220nF 20% 50V
2662	4822 122 32927	220nF 20% 50V
2663	4822 126 13881	470pF 5% 50V
2664	4822 126 13881	470pF 5% 50V
2665	4822 124 12095	100µF 20% 16V
2666	4822 124 12095	100µF 20% 16V
2667	3198 016 33380	3.3pF 50V
2668	3198 016 33380	3.3pF 50V
2669	4822 124 23002	10µF 16V
2670	5322 126 11583	10nF 10% 50V
2673	3198 016 31020	1nF 25V
2674	3198 016 31020	1nF 25V
2675	4822 124 23002	10µF 16V
2677	2020 021 91554	10µF 20% 16V
2678	2020 021 91554	10µF 20% 16V
2679	4822 126 14305	100nF 10% 16V
2680	2020 021 91554	10µF 20% 16V
2681	4822 126 14305	100nF 10% 16V
2682	2020 021 91554	10µF 20% 16V
2685	3198 016 31020	0603 25V 1nF
2686	3198 016 31020	0603 25V 1nF
2690	4822 126 14305	100nF 10% 16V
2691	4822 126 14305	100nF 10% 16V
2693	4822 126 13883	220pF 5% 50V
2702	2020 021 91554	10µF 20% 16V
2703	4822 126 14305	100nF 10% 16V
2704	2020 021 91554	10µF 20% 16V
2706	2020 021 91557	100µF 20% 16V
2707	4822 126 14305	100nF 10% 16V
2708	2020 021 91554	10µF 20% 16V
2709	4822 126 14305	100nF 10% 16V
2710	2020 021 91554	10µF 20% 16V
2712	2020 021 91554	10µF 20% 16V
2713	4822 126 14305	100nF 10% 16V
2717	4822 126 14218	3.9pF 50V
2718	4822 126 11669	27pF
2719	4822 126 11663	12pF
2720	4822 126 14218	3.9pF 50V
2721	4822 126 11669	27pF
2723	4822 126 11663	12pF
2724	4822 126 14218	3.9pF 50V
2725	4822 126 11669	27pF
2726	4822 126 11663	12pF
2728	4822 126 14305	100nF 10% 16V
2729	4822 126 14225	56pF 5% 50V
2730	4822 126 14494	22nF 10% 25V
2731	4822 122 31765	100pF 2% 63V 1206
2733	4822 126 14494	22nF 10% 25V
2738	4822 126 14494	22nF 10% 25V
2743	4822 126 14494	22nF 10% 25V
2747	4822 126 14507	18pF 5% 50V
2748	4822 126 14507	18pF 5% 50V
2755	4822 126 14305	100nF 10% 16V
2756	4822 126 14305	100nF 10% 16V
2757	2020 021 91554	10µF 20% 16V
2758	4822 126 14305	100nF 10% 16V
2759	4822 126 14305	100nF 10% 16V
2760	4822 126 14305	100nF 10% 16V
2761	4822 126 14305	100nF 10% 16V
2762	4822 126 14305	100nF 10% 16V
2763	4822 126 14305	100nF 10% 16V
2764	4822 126 14305	100nF 10% 16V
2765	4822 126 14305	100nF 10% 16V
2766	4822 126 14305	100nF 10% 16V
2767	4822 126 14305	100nF 10% 16V
2770	4822 126 14305	100nF 10% 16V
2771	4822 126 14305	100nF 10% 16V
2772	4822 126 14305	100nF 10% 16V
2773	3198 016 31020	0603 25V 1nF
2774	4822 126 14305	100nF 10% 16V
2776	4822 126 14305	100nF 10% 16V
2785	4822 126 14305	100nF 10% 16V
2786	4822 126 14305	100nF 10% 16V
2788	4822 126 14305	100nF 10% 16V
2790	4822 126 14305	100nF 10% 16V
2792	4822 126 14305	100nF 10% 16V
2795	4822 126 14305	100nF 10% 16V
2796	4822 126 14305	100nF 10% 16V
2798	3198 016 36810	680pF 25V
2902	5322 126 11583	10nF 10% 50V
2908	4822 126 13883	220pF 5% 50V
2909	4822 126 13883	220pF 5% 50V
2910	4822 126 13883	220pF 5% 50V
2911	4822 126 13883	220pF 5% 50V
2912	4822 126 13883	220pF 5% 50V
2913	4822 126 13883	220pF 5% 50V
2914	4822 126 13883	220pF 5% 50V
2915	4822 126 13883	220pF 5% 50V
2916	4822 126 13883	220pF 5% 50V
2917	4822 126 13883	220pF 5% 50V

-▭-

3001	4822 051 30472	4k7 5% 0.062W
3002	4822 051 30472	4k7 5% 0.062W
3003	4822 117 13525	24k 1% 0.62W
3006	4822 051 30471	470Ω 5% 0.062W
3007	3198 031 14710	4 X 470Ω PM5
3008	4822 117 13526	150Ω 5% 0.63W
3009	4822 051 30689	68Ω 5% 0.063W
3011	4822 051 30471	470Ω 5% 0.062W
3012	4822 051 30101	100Ω 5% 0.062W
3013	4822 051 30103	10k 5% 0.062W
3014	4822 051 30682	6k8 5% 0.062W
3015	4822 051 30474	470k 5% 0.062W
3016	4822 051 30152	1k5 5% 0.062W
3017	4822 051 30472	4k7 5% 0.062W
3018	4822 051 30103	10k 5% 0.062W
3019	4822 051 30472	4k7 5% 0.062W
3020	4822 051 30103	10k 5% 0.062W
3021	4822 051 30103	10k 5% 0.062W
3023	4822 051 30101	100Ω 5% 0.062W
3024	4822 051 30273	27k 5% 0.062W
3025	4822 051 30221	220Ω 5% 0.062W
3026	4822 051 30103	10k 5% 0.062W
3027	4822 117 12925	47k 1% 0.063W
3028	4822 051 30101	100Ω 5% 0.062W
3029	4822 051 30103	10k 5% 0.062W
3030	4822 051 30101	100Ω 5% 0.062W
3031	4822 051 30103	10k 5% 0.062W

3032	4822 051 30101	100Ω 5% 0.062W
3033	4822 051 30103	10k 5% 0.062W
3034	4822 051 30101	100Ω 5% 0.062W
3035	3198 031 11010	4 X 100Ω PM5
3039	4822 051 30101	100Ω 5% 0.062W
3040	4822 051 30103	10k 5% 0.062W
3041	4822 051 30562	5k6 5% 0.062W
3044	3198 031 14720	4 X 4k7 PM5
3058	4822 051 30682	6k8 5% 0.062W
3059	2322 704 66201	620Ω PM1
3060	4822 051 30103	10k 5% 0.062W
3061	4822 051 30103	10k 5% 0.062W
3062	4822 051 30103	10k 5% 0.062W
3064	3198 031 11010	4 X 100Ω PM5
3073	4822 051 30471	470Ω 5% 0.062W
3074	4822 051 30471	470Ω 5% 0.062W
3075	4822 051 30103	10k 5% 0.062W
3076	4822 051 30471	470Ω 5% 0.062W
3077	4822 051 30272	2k7 5% 0.062W
3078	4822 051 30471	470Ω 5% 0.062W
3079	4822 051 30471	470Ω 5% 0.062W
3080	4822 051 30472	4k7 5% 0.062W
3081	4822 051 30471	470Ω 5% 0.062W
3083	4822 051 30471	470Ω 5% 0.062W
3084	4822 051 30103	10k 5% 0.062W
3085	4822 051 30471	470Ω 5% 0.062W
3086	4822 051 30471	470Ω 5% 0.062W
3087	4822 051 30471	470Ω 5% 0.062W
3088	4822 051 30471	470Ω 5% 0.062W
3089	4822 117 12925	47k 1% 0.063W
3090	4822 051 30471	470Ω 5% 0.062W
3091	4822 051 30471	470Ω 5% 0.062W
3092	4822 051 30221	220Ω 5% 0.062W
3095	4822 051 30008	0Ω jumper
3097	4822 051 30474	470k 5% 0.062W
3098	4822 051 30472	4k7 5% 0.062W
3099	4822 117 12925	47k 1% 0.063W
3300	2322 750 63908	3Ω9 PM5
3301	4822 051 30109	10Ω 5% 0.062W
3304	2322 750 63908	3Ω9 PM5
3306	4822 051 30221	220Ω 5% 0.062W
3307	4822 051 30183	18k 5% 0.062W
3308	4822 051 30684	680k 5% 0.062W
3310	4822 117 12925	47k 1% 0.063W
3311	4822 117 13632	100k 1% 0.62W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30102	1k 5% 0.062W
3316	4822 051 30123	12k 5% 0.062W
3317	4822 051 30221	220Ω 5% 0.062W
3318	4822 051 30102	1k 5% 0.062W
3320	4822 051 30101	100Ω 5% 0.062W
3321	4822 051 30101	100Ω 5% 0.062W
3322	4822 051 10102	1k 2% 0.25W
3324	4822 051 30222	2k2 5% 0.062W
3327	4822 117 13632	100k 1% 0.62W
3328	4822 051 30393	39k 5% 0.062W
3329	4822 117 13568	6Ω8 5% 1206
3330	4822 051 30332	3k3 5% 0.062W
3331	4822 051 30102	1k 5% 0.062W
3333	4822 051 30102	1k 5% 0.062W
3334	4822 051 30102	1k 5% 0.062W
3335	4822 117 12903	1k8 1% 0.063W
3336	4822 051 30102	1k 5% 0.062W
3337	4822 117 12903	1k8 1% 0.063W
3338	4822 051 30392	3k9 5% 0.063W
3340	4822 051 30101	100Ω 5% 0.062W
3341	4822 051 30101	100Ω 5% 0.062W
3342	4822 051 30101	100Ω 5% 0.062W
3343	4822 051 30683	68k 5% 0.062W
3344	4822 051 30222	2k2 5% 0.062W
3345	4822 051 30103	10k 5% 0.062W
3346	4822 051 30333	33k 5% 0.062W
3347	4822 051 30223	22k 5% 0.062W
3348	4822 051 30222	2k2 5% 0.062W
3361	4822 051 30151	150Ω 5% 0.062W
3362	4822 051 30103	10k 5% 0.062W
3363	4822 051 30102	1k 5% 0.062W
3364	4822 051 30683	68k 5% 0.062W
3365	4822 051 30472	4k7 5% 0.062W
3366	4822 051 30102	1k 5% 0.062W
3367	4822 051 30102	1k 5% 0.062W
3370	4822 051 30101	100Ω 5% 0.062W
3371	4822 051 30479	47Ω 5% 0.062W
3372	4822 051 30471	470Ω 5% 0.062W
3376	4822 051 30101	100Ω 5% 0.062W
3377	4822 051 30101	100Ω 5% 0.062W
3378	4822 051 30153	15k 5% 0.062W
3382	4822 051 30471	470Ω 5% 0.062W
3384	4822 051 30101	100Ω 5% 0.062W
3385	4822 051 30471	470Ω 5% 0.062W
3386	4822 051 30223	22k 5% 0.062W
3388	4822 051 30681	680Ω 5% 0.062W
3389	4822 117 12925	47k 1% 0.063W
3390	4822 051 30183	18k 5% 0.062W
3391	4822 051 30683	68k 5% 0.062W
3393	4822 117 13632	100k 1% 0.62W
3394	4822 051 30472	4k7 5% 0.062W
3400	4822 117 11152	4Ω7 5%
3406	4822 051 30479	47Ω 5% 0.062W
3411	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30472	4k7 5% 0.062W
3415	4822 051 30222	2k2 5% 0.062W
3416	4822 117 13568	6Ω8 5% 1206
3418	4822 051 30391	390Ω 5% 0.062W
3419	4822 051 30759	75Ω 5% 0.062W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 051 30221	220Ω 5% 0.062W
3437	4822 051 30102	1k 5% 0.062W
3439	4822 051 30471	470Ω 5% 0.062W
3441	4822 051 30103	10k 5% 0.062W
3445	4822 051 30471	470Ω 5% 0.062W
3446	4822 051 30101	100Ω 5% 0.062W
3532	4822 051 30102	1k 5% 0.062W
3533	4822 051 30103	10k 5% 0.062W
3540	4822 051 30103	10k 5% 0.062W
3550	4822 051 30102	1k 5% 0.062W
3551	4822 051 30102	1k 5% 0.062W
3610	4822 117 12925	47k 1% 0.063W
3611	4822 117 12925	47k 1% 0.063W
3612	4822 117 12925	47k 1% 0.063W
3613	4822 117 12925	47k 1% 0.063W
3614	4822 117 12925	47k 1% 0.063W
3615	4822 117 12925	47k 1% 0.063W
3621	4822 051 30105	1M 5% 0.062W
3637	4822 051 30105	1M 5% 0.062W
3653	4822 051 30008	0Ω jumper
3654	4822 051 30008	0Ω jumper
3655	4822 051 30101	100Ω 5% 0.062W
3656	4822 051 30101	100Ω 5% 0.062W
3658	4822 051 30334	330k 5% 0.062W
3660	4822 051 30334	330k 5% 0.062W
3662	3198 017 31530	15nF 50V
3673	4822 051 30472	4k7 5% 0.062W
3680	3198 017 31530	15nF 50V
3683	4822 051 30272	2k7 5% 0.062W
3684	4822 051 30008	0Ω jumper
3685	4822 051 30008	0Ω jumper
3688	4822 051 30008	0Ω jumper
3689	4822 051 30008	0Ω jumper
3702	4822 117 12139	22Ω 5% 0.062W
3703	4822 051 30101	100Ω 5% 0.062W
3705	4822 051 30101	100Ω 5% 0.062W
3706	4822 051 30109	10Ω 5% 0.062W
3707	4822 051 30392	3k9 5% 0.063W
3708	4822 051 30272	2k7 5% 0.062W
3709	4822 051 30008	0Ω jumper
3710	4822 051 30391	390Ω 5% 0.062W
3711	4822 051 30102	1k 5% 0.062W
3712	4822 051 30391	390Ω 5% 0.062W
3713	4822 051 30391	390Ω 5% 0.062W
3714	4822 117 12139	22Ω 5% 0.062W
3716	4822 051 30472	4k7 5% 0.062W
3717	4822 051 30472	4k7 5% 0.062W
3718	4822 051 30221	220Ω 5% 0.062W
3719	4822 117 13574	1Ω5 5%
3720	4822 117 13574	1Ω5 5%
3721	4822 117 13572	22Ω 5%
3722	4822 117 13572	22Ω 5%
3725	4822 051 30105	1M 5% 0.062W
3728	4822 051 30101	100Ω 5% 0.062W
3731	4822 051 30101	100Ω 5% 0.062W
3732	4822 051 10102	1k 2% 0.25W
3733	4822 051 30101	100Ω 5% 0.062W
3739	4822 051 30101	100Ω 5% 0.062W
3740	4822 051 30008	0Ω jumper
3741	4822 051 30102	1k 5% 0.062W
3744	4822 051 30102	1k 5% 0.062W
3745	4822 051 30102	1k 5% 0.062W
3746	4822 051 30472	4k7 5% 0.062W
3747	4822 051 30689	68Ω 5% 0.063W
3748	4822 051 30689	68Ω 5% 0.063W
3749	4822 051 30689	68Ω 5% 0.063W
3754	4822 051 30109	10Ω 5% 0.062W
3755	4822 051 30008	0Ω jumper
3757	4822 051 30008	0Ω jumper
3759	4822 051 30008	0Ω jumper
3790	3198 031 11010	4 X 100Ω PM5
3791	3198 031 11010	4 X 100Ω PM5
3792	3198 031 11010	4 X 100Ω PM5
3793	3198 031 11010	4 X 100Ω PM5
3794	3198 031 11010	4 X 100Ω PM5
3795	3198 031 11010	4 X 100Ω PM5
3796	4822 051 30101	100Ω 5% 0.062W
3797	4822 051 30101	100Ω 5% 0.062W
3798	4822 117 13572	22Ω 5%

5301	4822 157 11876	6.8µH 10%
5302	4822 157 11876	6.8µH 10%
5403	2422 549 44461	COI VAR
5404	2422 535 95427	Bead 120R at 100MHz
5405	2422 535 95427	Bead 120R at 100MHz
5406	3198 018 33980	3.9uH PM10
5407	3198 018 56880	6.8uH PM10
5408	2422 549 44983	COI VAR
5409	3198 018 51080	1uH PM10
5410	3198 018 33370	0.33uH PM10
5651	2422 549 43769	Bead 30R at 100MHz
5652	2422 549 43769	Bead 30R at 100MHz
5653	2422 549 43769	Bead 30R at 100MHz
5654	4822 157 11716	Bead BLM21P300SPT
5701	4822 157 71206	Bead BLM21A601SPT
5702	2422 535 95427	Bead 120R at 100MHz
5703	4822 157 11716	Bead BLM21P300SPT
5704	4822 157 11716	Bead BLM21P300SPT
5705	2422 535 95427	Bead 120R at 100MHz
5706	4822 157 11778	5.6uH 10%
5707	4822 157 11074	100µH
5708	4822 157 11778	5.6uH 10%
5709	4822 157 11778	5.6uH 10%
5710	4822 157 11778	5.6uH 10%
5711	4822 157 11074	100µH
5713	4822 157 11074	100µH
5718	3198 018 33370	0.33uH PM10
5720	4822 157 11074	100µH
5911	4822 157 11074	100µH
5912	4822 157 11074	100µH
5913	4822 157 11074	100µH
5914	4822 157 11074	100µH
5915	4822 157 11074	100µH
5916	4822 157 11074	100µH
5917	4822 157 11074	100µH
5918	4822 157 11074	100µH
5919	4822 157 11074	100µH
5920	4822 157 11074	100µH
5921	4822 157 11074	100µH
5922	4822 157 11074	100µH
5923	4822 157 11074	100µH
5924	4822 157 11074	100µH
5925	4822 157 11074	100µH
5926	4822 157 11074	100µH
5927	4822 157 11074	100µH
5928	4822 157 11074	100µH
5929	4822 157 11074	100µH
5930	4822 157 11074	100µH
5931	4822 157 11074	100µH
5932	4822 157 11074	100µH
5933	4822 157 11074	100µH
5934	4822 157 11074	100µH
5935	4822 157 11074	100µH
5940	4822 157 11074	100µH
5941	4822 157 11074	100µH
5942	4822 157 11074	100µH
5943	4822 157 11074	100µH
5944	4822 157 11074	100µH
5947	4822 157 11074	100µH
5948	4822 157 11074	100µH
5949	4822 157 11074	100µH
5950	4822 157 11074	100µH
5951	4822 157 11074	100µH

6001	4822 130 11528	1PS76SB10
6002	4822 130 83757	MCL4148
6003	4822 130 11528	1PS76SB10
6303	4822 130 11594	BZX284-C47
6304	4822 130 83757	MCL4148
6306	9322 129 37685	DIO REG SM BZM55-C5V6 (TEG0)
6307	4822 130 11528	1PS76SB10
6309	4822 130 83757	MCL4148
6310	9322 129 38685	DIO REG SM BZM55-C6V8 (TEG0)
6311	9322 149 08685	DIO REG SM BZM55-C22 (VISH) R
6312	4822 130 83757	MCL4148
6313	9322 149 08685	DIO REG SM BZM55-C22 (VISH) R
6314	4822 130 83757	MCL4148
6319	4822 130 83757	MCL4148
6334	4822 130 83757	MCL4148
6403	4822 130 11525	1SS356
6652	9322 129 40685	BZM55-C10
6653	4822 130 83757	MCL4148

7001	9352 629 88557	SAA5801H/011
7002	9340 218 50115	BC857BW
7003	3198 010 42310	BC847BW
7004	3198 010 42310	BC847BW
7005	9322 116 74668	LD1117D33
7006	9965 000 07280	Software, see Prod.Surv.
7007	9322 157 20668	MSM51V18165F-60J
7008	3198 010 42310	BC847BW
7009	3198 010 42310	BC847BW
7010	9340 218 50115	BC857BW
7011	9322 156 81668	M24C32-WMN6TNKSA
7014	3198 010 42310	BC847BW
7015	9340 218 50115	BC857BW (PHSE)
7301	9352 685 88518	TDA9330H/N2/S2
7303	9340 218 50115	BC857BW (PHSE)
7308	9340 310 30215	PDTC144ET
7309	9340 310 30215	PDTC144ET
7310	9340 310 30215	PDTC144ET
7311	3198 010 42310	BC847BW
7312	3198 010 42310	BC847BW
7320	3198 010 42310	BC847BW
7322	3198 010 42310	BC847BW
7323	9352 625 24518	TDA9321H/N2
7324	9340 217 80115	BC847CW
7340	3198 010 42310	BC847BW
7403	4822 130 60511	BC847B
7407	4822 130 60373	BC856B
7411	4822 130 60511	BC847B
7651	9322 169 38702	MSP3411G-FH-B8
7652	9351 874 90118	74HC4052PW
7656	9340 425 20115	BC847BS
7674	3198 010 42310	BC847BW
7680	3198 010 42310	BC847BW
7701	9340 218 50115	BC857BW
7702	3198 010 42310	BC847BW
7704	4822 209 73852	PMBT2369
7708	4822 209 90034	SAA4990H/V0
7709	9352 640 20557	SAA4978H/V203
7713	9322 116 74668	LD1117D33
7714	4822 209 17307	MSM54V12222A-30JS
7715	4822 209 17307	MSM54V12222A-30JS
7716	3104 317 42341	FBX Software R_EP_2

DC-shift + Anti-Moiré [G]

Various

0317	4822 265 20723	CON 2P Male
0318	4822 265 20723	CON 2P Male
0325	2422 025 16382	CON 3P Male
0329	2422 025 16382	CON 3P Male
0395	2422 025 16407	CON 3P Male
1430	2422 086 10581	Fuse 400mA

2430	4822 122 31177	470pF 10% 500V
2431	4822 122 31177	470pF 10% 500V
2640	4822 124 11767	470µF 20% 25V
2641	4822 126 14305	100nF 10% 16V

3640	4822 051 30103	10k 5% 0.062W
3641	4822 051 30223	22k 5% 0.062W
3642	4822 052 10229	22Ω 5% 0.33W
3648	5322 117 13029	47k 1% 0.063W
3649	2322 704 65603	56k 1% 0.063W
3650	5322 117 13037	2k2 1% 0.063W
3651	4822 051 30221	220Ω 5% 0.062W
3652	4822 051 30152	1k5 5% 0.062W
3999	4822 051 30102	1k 5% 0.062W

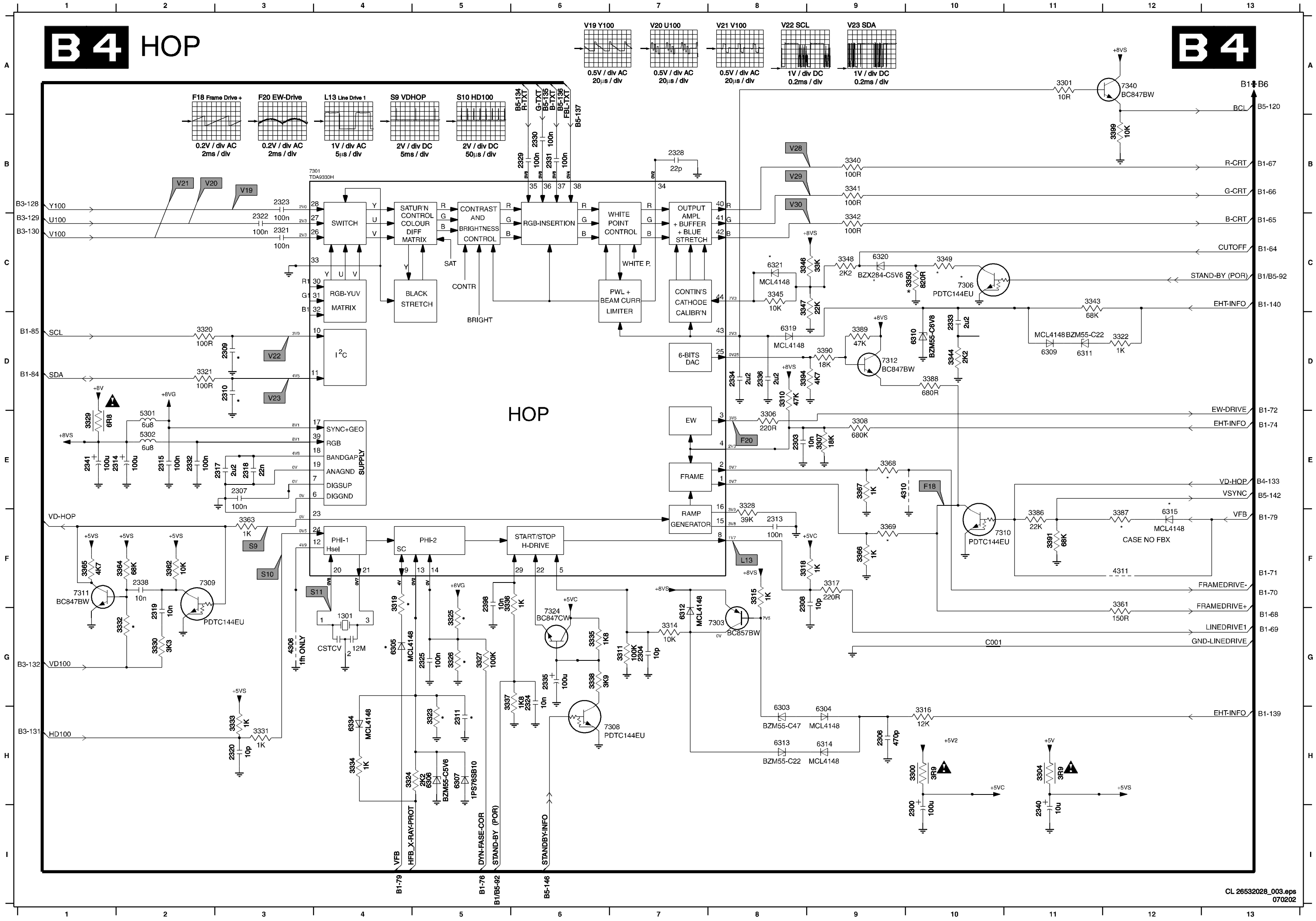
5430	3128 138 38911	DC SHIFT COIL

6432	9340 317 00133	BYD33V
6433	9340 317 00133	BYD33V
6640	4822 130 83757	MCL4148
6641	9340 548 67115	PDZ22B
6642	4822 130 11148	UDZ4.7B
6643	9340 548 52115	PDZ5.1B
6646	4822 130 83757	MCL4148

7640	9337 133 90653	74HCT74D
7642	4822 130 60373	BC856B

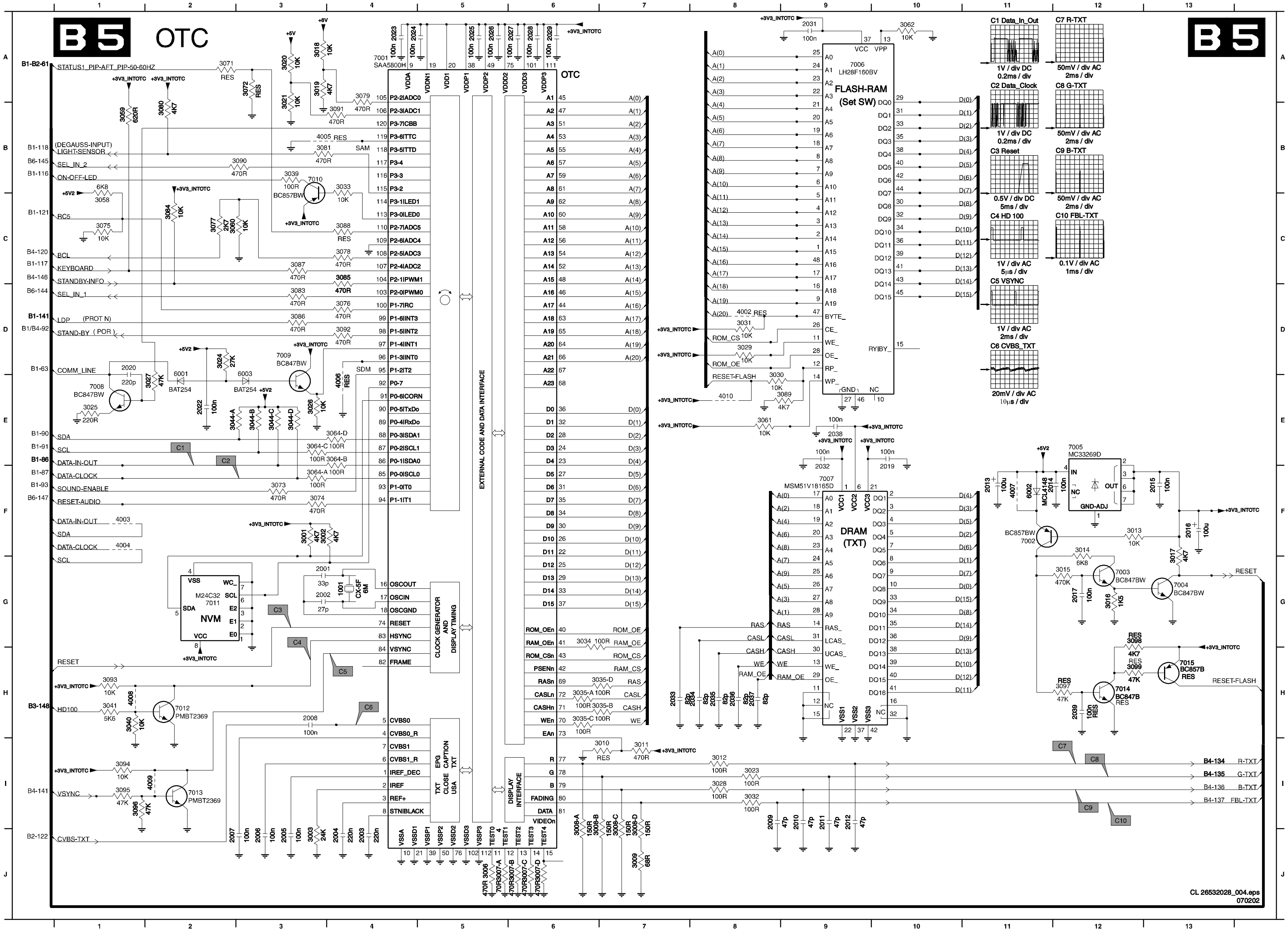
Electrical Diagrams and Print-Layouts

SSB: HOP


B 4
HOP
V19 Y100
V20 U100
V21 Y100
V22 SCL
V23 SDA
0.5V / div AC 20µs / div
1V / div DC 0.2ms / div
F18 Frame Drive +
F20 EW-Drive
L13 Line Drive 1
S9 VDHOP
S10 HD100
0.2V / div AC 2ms / div
1V / div AC 5µs / div
2V / div DC 5ms / div
2V / div DC 50µs / div
7301 TDA9330H
SWITCH
SATUR'N CONTROL COLOUR DIFF MATRIX
CONTRAST AND BRIGHTNESS CONTROL
RGB-INSERTION
WHITE POINT CONTROL
OUTPUT AMPL + BUFFER + BLUE STRETCH
RGB-YUV MATRIX
BLACK STRETCH
PWL + BEAM CURR LIMITER
CONTIN'S CATHODE CALIBR'N
I²C
6-BITS DAC
EW
FRAME
RAMP GENERATOR
SYNC+GEO
RGB
BANDGAP
ANAGND
DIGSUP
DIGGND
SUPPLY
PHI-1 Hsel
PHI-2
START/STOP H-DRIVE
SAT
CONTR
BRIGHT
WHITE P.
B3-128 Y100
B3-129 U100
B3-130 V100
B1-85 SCL
B1-84 SDA
VD-HOP
B3-132 VD100
B3-131 HD100
B5-134 R-TXT
B5-135 G-TXT
B5-136 B-TXT
B5-137 FBL-TXT
B1 B6
BCL B5-120
R-CRT B1-67
G-CRT B1-66
B-CRT B1-65
CUTOFF B1-64
STAND-BY (POR) B1/B5-92
EHT-INFO B1-140
EW-DRIVE B1-72
EHT-INFO B1-74
VD-HOP B4-133
VSYNC B5-142
VFB B1-79
B1-71
FRAMEDRIVE- B1-70
FRAMEDRIVE+ B1-68
LINEDRIVE1 B1-69
GND-LINEDRIVE
C001
EHT-INFO B1-139
CASE NO FBX
VFB B1-79
HFB_X-RAY-PROT
DYN-FASE-COR B1-76
STAND-BY (POR) B1/B5-92
STANDBY-INFO B5-146
7340 BC847BW
7306 PDTC144EU
7312 BC847BW
7310 PDTC144EU
7311 BC847BW
7309 PDTC144EU
7324 BC847CW
7308 PDTC144EU
7303 BC857BW
1301 CSTCV 12M
4306 1fh ONLY
+8VS
+8VG
+5VS
+5VC
+5V2
+5V
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I
CL 26532028_003.eps
070202

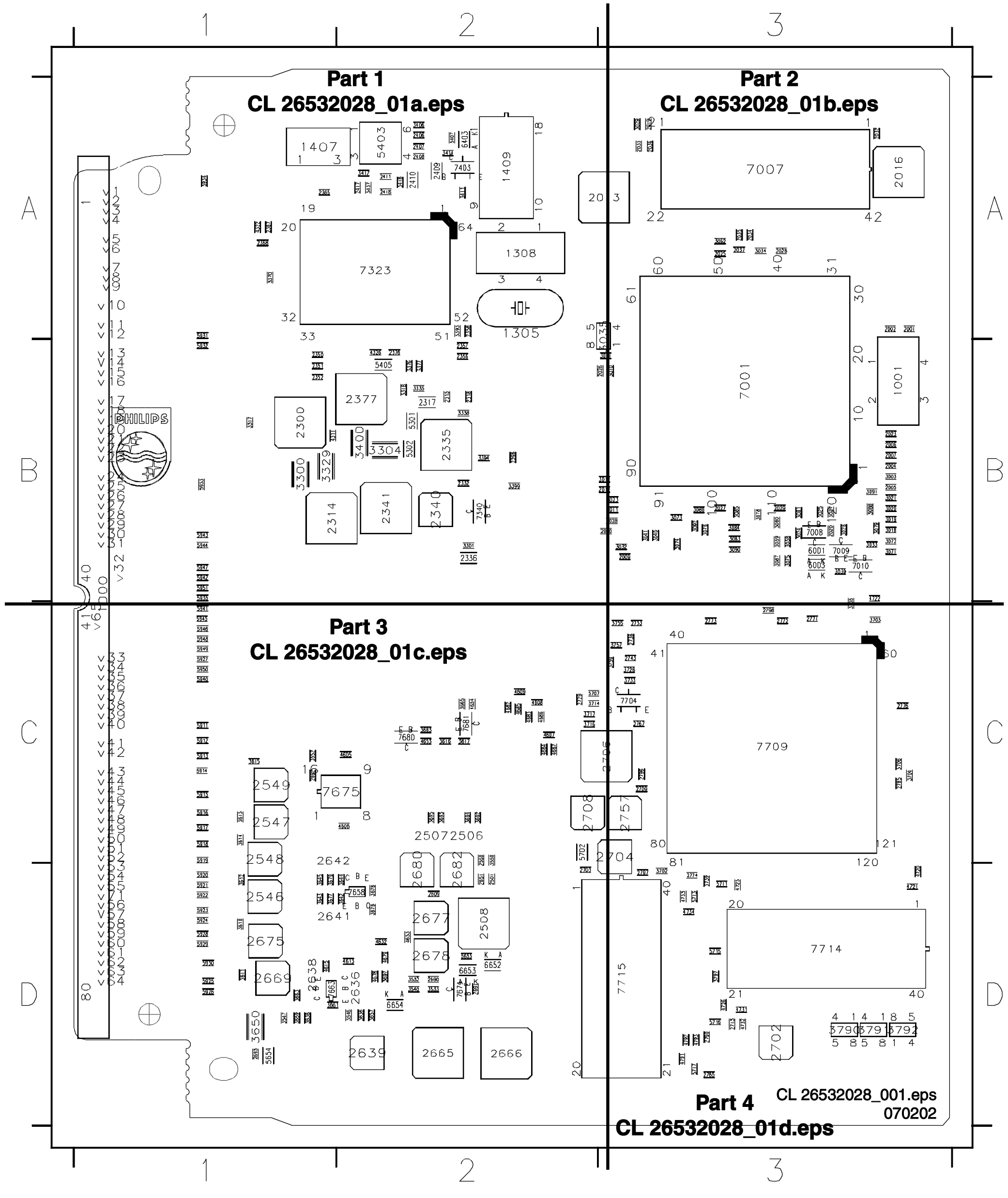
1301	G4
2300	I10
2303	E8
2304	G7
2306	H9
2307	E3
2308	F8
2309	D3
2310	D3
2311	H5
2313	F8
2314	E2
2315	E2
2317	E3
2318	E3
2319	G2
2320	H3
2321	C3
2322	C3
2323	B3
2324	G6
2325	G5
2328	B7
2329	B6
2330	B6
2331	B6
2332	E2
2333	D10
2334	D8
2335	G6
2336	D8
2338	F2
2340	I11
2341	E1
2398	F5
3300	H10
3301	A11
3304	H11
3306	E8
3307	E9
3308	E9
3310	D8
3311	G7
3314	G7
3315	F8
3316	H10
3317	F9
3318	F8
3319	F4
3320	D2
3321	D2
3322	D12
3323	H5
3324	H4
3325	G5
3326	G5
3327	G5
3328	E8
3329	E1
3330	G2
3331	H3
3332	G2
3333	H3
3334	H4
3335	G6
3336	F5
3337	G5
3338	G6
3340	B9
3341	B9
3342	C9
3343	C11
3344	D10
3345	C8
3346	C8
3347	C8
3348	C9
3349	C10
3350	C10
3361	F12
3362	F2
3363	F3
3364	F2
3365	F1
3366	F9
3367	E9
3368	E9
3369	F9
3386	F11
3387	F12
3388	D10
3389	D9
3390	D9
3391	F11
3394	D8
3399	B12
4306	G3
4310	E10
4311	F12
5301	E2
5302	E2
6303	H8
6304	H9
6305	G4
6306	H5
6307	H5
6309	D11
6310	D10
6311	D11
6312	G7
6313	H8
6314	H9
6315	F12
6319	D8
6320	C9
6321	C8
6334	H4
7301	B3
7303	G8
7306	C10
7308	H6
7309	F3
7310	F11
7311	F1
7312	D9
7324	G6
7340	A12
C001	G10

SSB: OTC


B5
OTC
7001 SAA5800H
OTC
EXTERNAL CODE AND DATA INTERFACE
CLOCK GENERATOR AND DISPLAY TIMING
EPG CLOSE CAPTION TXT TXT USA
DISPLAY INTERFACE
7006 LH28F160BV
FLASH-RAM (Set SW)
7007 MSM51V18165D
DRAM (TXT)
7011 M24C32 NVM
7005 MC33269D
GND-ADJ
STATUS1_PIP-AFT_PIP-50-60HZ
(DEGAUSS-INPUT) LIGHT-SENSOR
SEL_IN_2
ON-OFF-LED
RC5
BCL
KEYBOARD
STANDBY-INFO
SEL_IN_1
LDP (PROT N)
STAND-BY (POR)
COMM_LINE
SDA
SCL
DATA-IN-OUT
DATA-CLOCK
SOUND-ENABLE
RESET-AUDIO
RESET
HD100
VSYNC
CVBS-TXT
RESET-FLASH
ROM_CS
ROM_OE
RAM_OE
RAS
CASL
CASH
WE
R-TXT
G-TXT
B-TXT
FBL-TXT
B1-B2-61
B1-118
B6-145
B1-116
B1-121
B4-120
B1-117
B4-146
B6-144
B1-141
B1/B4-92
B1-63
B1-90
B1-91
B1-86
B1-87
B1-93
B6-147
B3-148
B4-141
B2-122
B4-134
B4-135
B4-136
B4-137
+3V3_INTOTC
+5V
+8V
+5V2
C1 Data_In_Out
1V / div DC 0.2ms / div
C2 Data_Clock
1V / div DC 0.2ms / div
C3 Reset
0.5V / div DC 5ms / div
C4 HD 100
1V / div AC 5μs / div
C5 VSYNC
1V / div AC 2ms / div
C6 CVBS_TXT
20mV / div AC 10μs / div
C7 R-TXT
50mV / div AC 2ms / div
C8 G-TXT
50mV / div AC 2ms / div
C9 B-TXT
50mV / div AC 2ms / div
C10 FBL-TXT
0.1V / div AC 1ms / div
7008 BC847BW
7009 BC847BW
7010 BC857BW
7012 PMBT2369
7013 PMBT2369
7002 BC857BW
7003 BC847BW
7004 BC847BW
7014 BC847B
7015 BC857B
1001 CX-5F 6M
CL 26532028_004.eps
070202

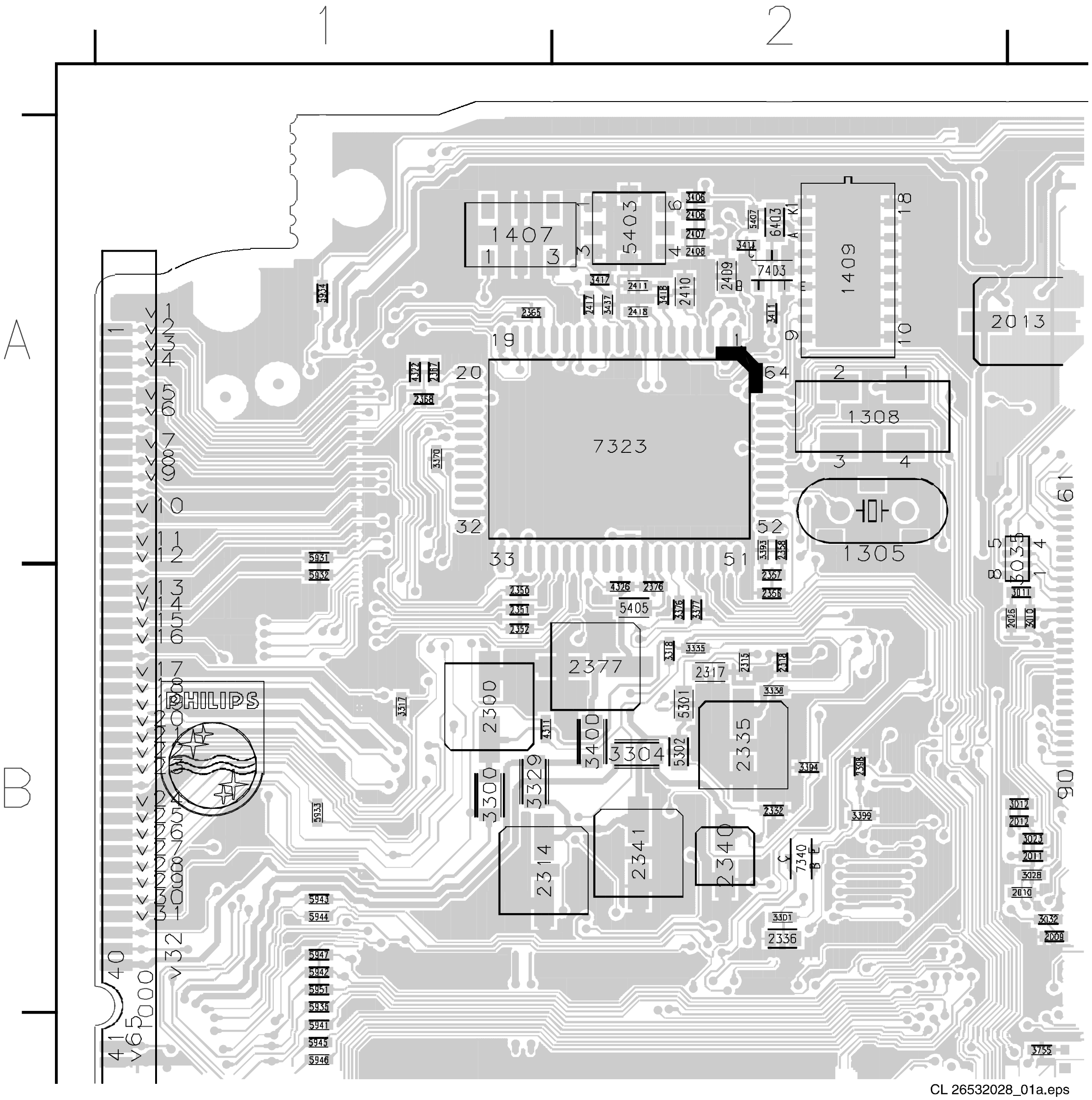
1001 G4	3071 A2
2001 G3	3072 A3
2002 G3	3073 F3
2003 J4	3074 F3
2004 J4	3075 C1
2005 J3	3076 D4
2006 J3	3077 C2
2007 J2	3078 C4
2008 H3	3079 A4
2009 I8	3080 B2
2010 I9	3081 B3
2011 I9	3083 D3
2012 I9	3084 C2
2013 F11	3085 C4
2014 F11	3086 D3
2015 F13	3087 C3
2016 F13	3088 C4
2017 G12	3089 E9
2019 E10	3090 B3
2020 D1	3091 B4
2022 E2	3092 D4
2023 A4	3093 H1
2024 A4	3094 I1
2025 A5	3095 I1
2026 A5	3096 I1
2027 A6	3097 H12
2028 A6	3098 G12
2029 A6	3099 H12
2031 A9	4002 D8
2032 E9	4003 F1
2033 H7	4004 F1
2034 H8	4005 B3
2035 H8	4006 E4
2036 H8	4007 F11
2037 H8	4008 H1
2038 E9	4009 I2
2039 H12	4010 E8
3001 F3	6001 E2
3002 F3	6002 F11
3003 J3	6003 E3
3006 J5	7001 A4
3007-A J5	7002 F11
3007-B J6	7003 G12
3007-C J6	7004 G13
3007-D J6	7005 E12
3008-A I6	7006 A9
3008-B I6	**7007 F9**
3008-C I7	**7008 E1**
3008-D I7	**7009 D3**
3009 J7	**7010 B3**
3010 I7	**7011 G2**
3011 I7	**7012 H2**
3012 I8	7013 I2
3013 F12	7014 H12
3014 F12	7015 H13
3015 G12	
3016 G12	
3017 F13	
3018 A3	
3019 A3	
3020 A3	
3021 A3	
3023 I8	
3024 D2	
3025 E1	
3026 E3	
3027 E2	
3028 I8	
3029 D8	
3030 E8	
3031 D8	
3032 I8	
3033 B4	
3034 G6	
3035-A H6	
3035-B H7	
3035-C H6	
3035-D H7	
3039 B3	
3040 H1	
3041 H1	
3044-A E2	
3044-B E3	
3044-C E3	
3044-D E3	
3058 C1	
3059 B1	
3060 C2	
3061 E8	
3062 A10	
3064-A F3	
3064-B E4	
3064-C E3	
3064-D E4	

Layout SSB (Overview LOT Side)


1
2
3
A
B
C
D
Part 1
CL 26532028_01a.eps
Part 2
CL 26532028_01b.eps
Part 3
CL 26532028_01c.eps
Part 4
CL 26532028_01d.eps
CL 26532028_001.eps
070202
1407
5403
1409
2013
7007
2016
7323
1308
1305
7001
1001
2377
2300
2335
2314
2341
2340
PHILIPS
7709
7675
2549
2547
2548
2546
2675
2669
2680
2682
2677
2678
2508
2705
2708
2757
2704
7715
7714
2702
2639
2665
2666
3650

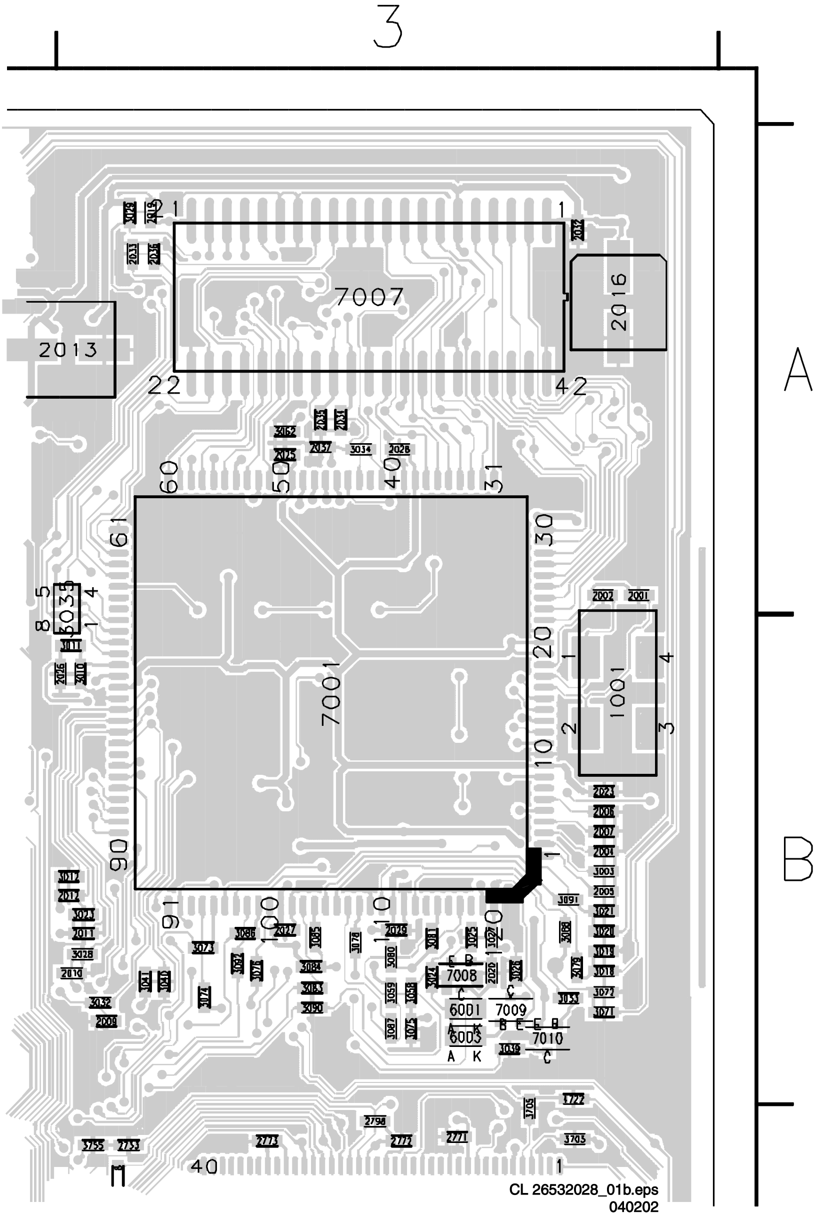
1000	B1	2550	C2	3072	B3	3683	C2	5716	D3
1001	B3	2609	D2	3073	B3	3692	C2	5717	D3
1305	A2	2636	D2	3074	B3	3693	C2	5911	C1
1308	A2	2638	D1	3075	B3	3694	C2	5912	C1
1407	A1	2639	D1	3076	B3	3695	C2	5913	C1
1409	A2	2641	D1	3078	B3	3697	D2	5914	C1
2001	A3	2642	C2	3079	B3	3702	D3	5915	C1
2002	A3	2651	D2	3080	B3	3703	C3	5916	C1
2004	B3	2665	D2	3081	B3	3704	C3	5917	C1
2005	B3	2666	D2	3083	B3	3705	C3	5918	C1
2006	B3	2669	D1	3084	B3	3706	C3	5919	C1
2007	B3	2675	D1	3085	B3	3714	C2	5920	D1
2009	B3	2677	D2	3086	B3	3716	C2	5921	D1
2010	B3	2678	D2	3087	B3	3717	C2	5922	D1
2011	B3	2680	D2	3088	B3	3728	C3	5923	D1
2012	B3	2682	C2	3090	B3	3733	C3	5924	D1
2013	A3	2690	D2	3091	B3	3739	D3	5925	D1
2016	A3	2691	D2	3092	B3	3755	C3	5926	D1
2019	A3	2692	C1	3300	B1	3757	C3	5927	C1
2020	B3	2693	D1	3301	B2	3759	C3	5928	D1
2023	B3	2702	D3	3304	B2	3790	D3	5929	D1
2025	A3	2703	D2	3317	B1	3791	D3	5930	D1
2026	B3	2704	C3	3318	B2	3792	D3	5931	A1
2027	B3	2706	C2	3329	B2	3797	D3	5932	B1
2028	A3	2708	C2	3335	B2	4311	B1	5933	B1
2029	B3	2709	C3	3338	B2	4322	A1	5934	A1
2032	A3	2713	D3	3370	A1	4326	B2	5935	B1
2033	A3	2729	C2	3376	B2	4605	C2	5940	C1
2034	A3	2733	C3	3377	B2	4606	C2	5941	C1
2035	A3	2738	C3	3393	A2	4607	C2	5942	B1
2036	A3	2743	C3	3394	B2	4608	C2	5943	B1
2037	A3	2757	C3	3399	B2	4609	C2	5944	B1
2300	B1	2765	D3	3400	B2	4613	D2	5945	C1
2314	B1	2767	C3	3406	A2	4615	D1	5946	C1
2315	B2	2771	C3	3411	A2	4632	D2	5947	B1
2317	B2	2772	C3	3414	A2	4633	D2	5948	C1
2318	B2	2773	C3	3417	A2	4653	C2	5949	C1
2332	B2	2774	D3	3418	A2	4654	C2	5950	C1
2335	B2	2776	C3	3437	A2	4678	D2	5951	B1
2336	B2	2785	C3	3532	D2	4679	D2	6001	B3
2340	B2	2790	D3	3533	D2	4682	C2	6003	B3
2341	B2	2796	C3	3540	D2	4683	C2	6403	A2
2350	B1	2797	D3	3546	D2	4684	C2	6652	D2
2351	B1	2798	C3	3547	D1	4685	C2	6653	D2
2352	B1	3003	B3	3550	C2	4686	C2	6654	D2
2356	B2	3010	B3	3552	C1	4687	C2	7001	B3
2357	B2	3011	B3	3610	D1	4720	D3	7007	A3
2358	A2	3012	B3	3611	D1	4721	D3	7008	B3
2365	A1	3018	B3	3612	D1	4722	B3	7009	B3
2367	A1	3019	B3	3613	C1	4723	D3	7010	B3
2368	A1	3020	B3	3614	C1	4726	D3	7323	A1
2376	B2	3021	B3	3615	C1	4731	D3	7340	B2
2377	B2	3023	B3	3616	C2	4732	D3	7403	A2
2398	B2	3024	B3	3617	C2	4733	D3	7658	D2
2406	A2	3025	B3	3636	D2	4734	D3	7663	D1
2407	A2	3026	B3	3638	D1	4791	D3	7674	D2
2408	A2	3027	B3	3642	D2	4792	D3	7675	C2
2409	A2	3028	B3	3643	D1	4793	D3	7680	C2
2410	A2	3029	A3	3644	D2	5301	B2	7681	C2
2411	A2	3032	B3	3645	D1	5302	B2	7704	C3
2417	A2	3033	B3	3650	D1	5403	A2	7709	D3
2418	A2	3034	A3	3657	D2	5405	B2	7714	D3
2501	D2	3035	A3	3659	D1	5407	A2	7715	D3
2506	C2	3039	B3	3661	D1	5653	D2		
2507	C2	3040	B3	3663	D1	5654	D1		
2508	D2	3041	B3	3665	C2	5702	C2		
2546	D1	3058	B3	3676	D2	5707	C2		
2547	C1	3059	B3	3677	D1	5711	D3		
2548	C1	3062	A3	3678	D2	5713	D3		
2549	C1	3071	B3	3679	D1	5715	D3		

Layout SSB (Part 1 LOT Side)


1
2
A
B
1407
5403
1409
2013
7323
1308
1305
7403
6403
2410
2409
2377
2300
2335
3304
3400
3300
3329
2314
2341
2340
2317
5405
5301
5302
2336
7340
PHILIPS
1000
19
20
32
33
51
52
64

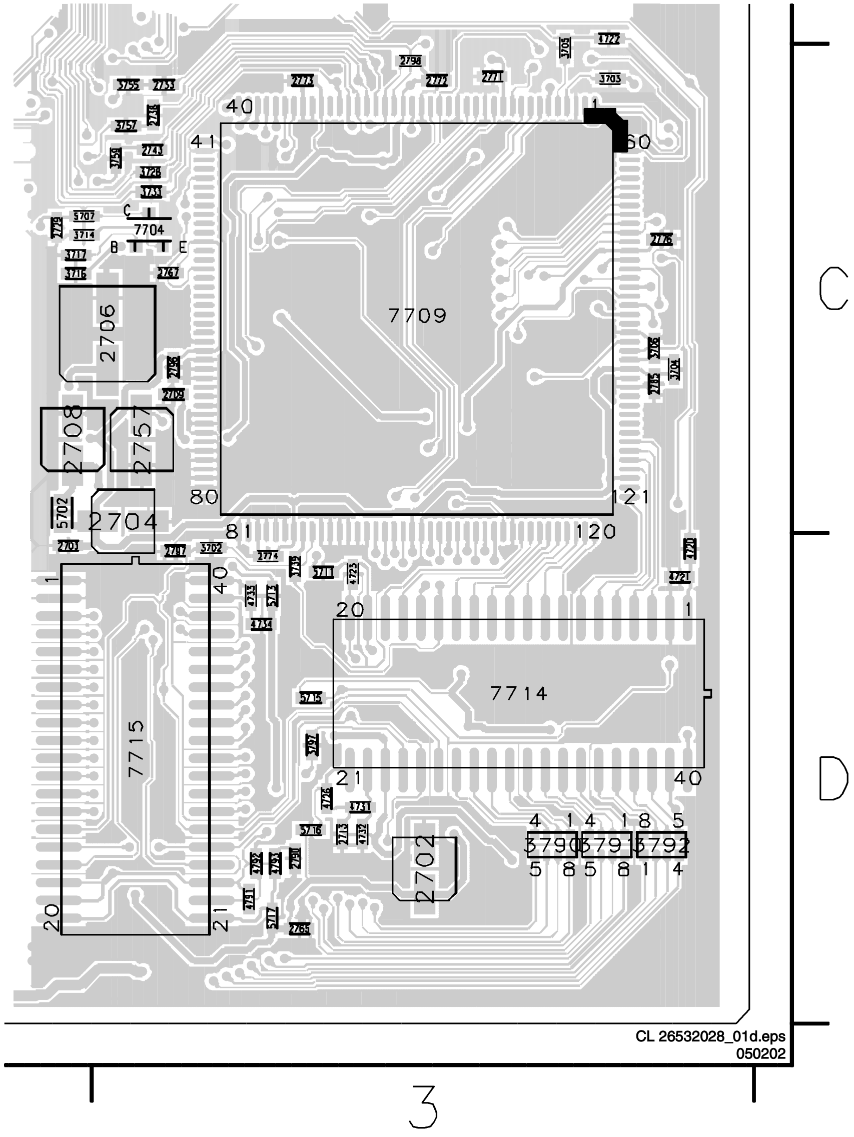
CL 26532028_01a.eps
070202

Layout SSB (Part 2 LOT Side)


3
A
B
7007
2016
2013
7001
1001
6003
7008
6001
7009
7010
2002
2001
2023
2006
2007
2004
3003
2005
3091
3086
3021
3022
3053
3072
3071
3012
2012
3023
2011
3028
2010
3032
2008
3011
3010
3073
3085
3084
3083
3090
2027
2029
3059
3058
3087
3025
3039
3062
2025
2057
3034
2028
2798
2772
2771
2773
3755
2753
3722
3703
3705
40
1
22
42
60
50
40
31
30
20
10
61
90
91
100
110
120

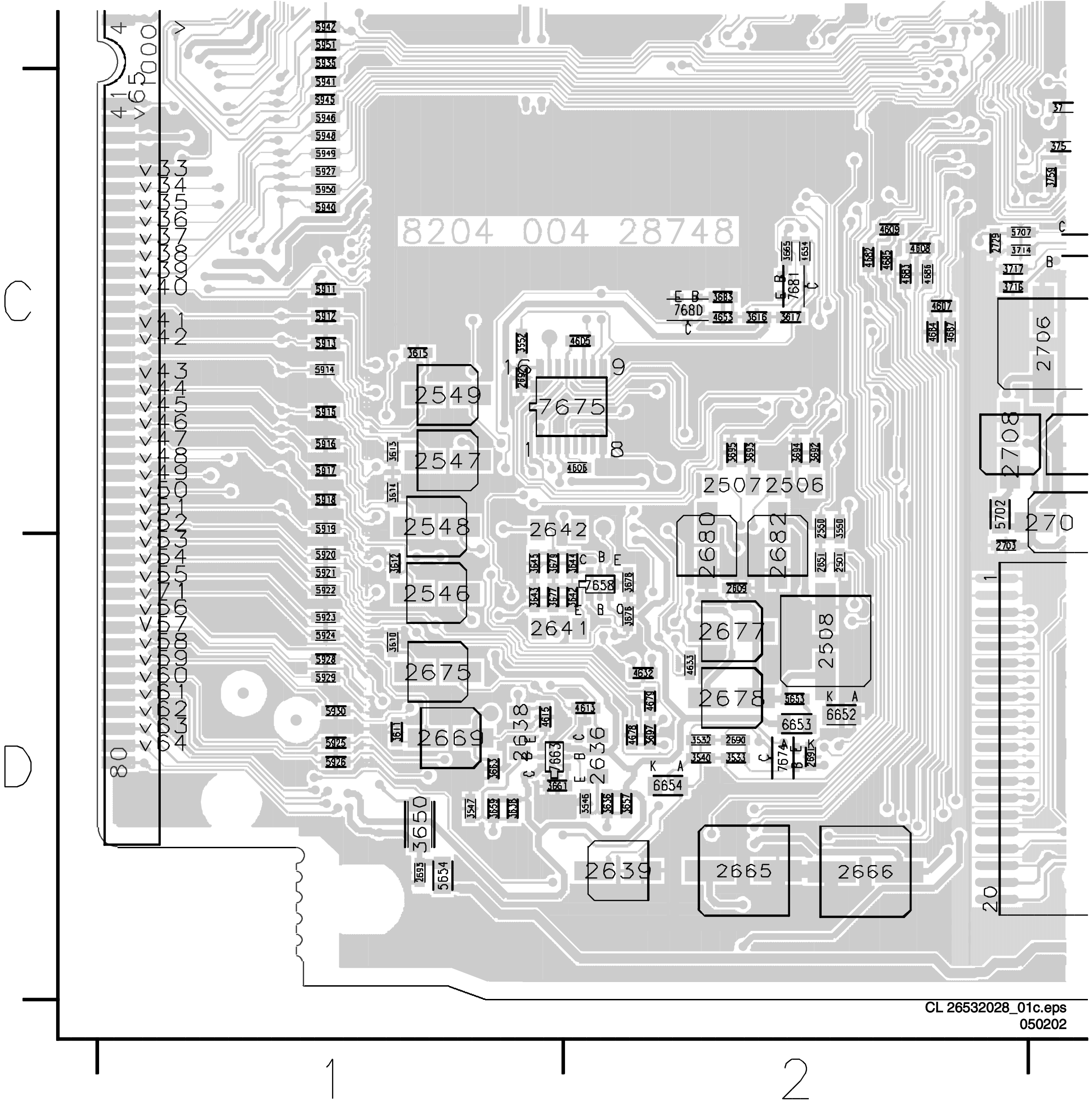
CL 26532028_01b.eps
040202

Layout SSB (Part 4 LOT Side)


C
D
3
7709
7714
7715
7704
2706
2708
2757
2704
2702
5702
3790
3791
3792
2701
2707
3702
2774
3711
5715
5716
2765
3707
3714
3717
3716
2767
3757
3755
2753
2773
2798
2772
2771
3722
3703
3705
2776
3720
4721
40
41
60
80
81
120
121
1
20
21
40

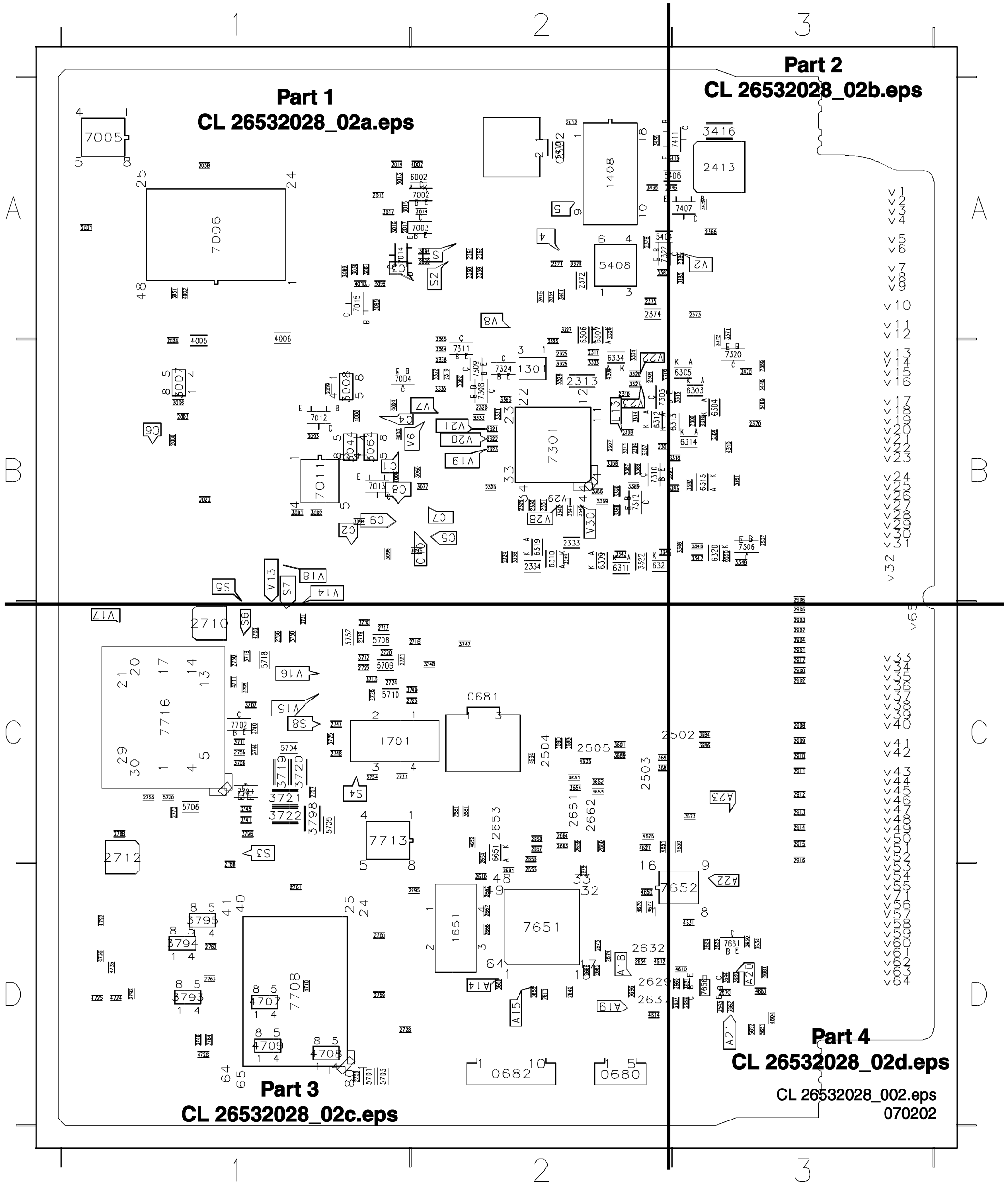
CL 26532028_01d.eps
050202

Layout SSB (Part 3 LOT Side)


C
D
1
2
8204 004 28748
1000
2549
2547
2548
2546
2675
2669
2642
2641
7675
7658
2638
2636
7663
3650
5654
2639
2665
2666
2680
2682
2677
2678
2508
2507
2506
6653
6652
6654
7674
7680
7681
2706
2708
2709
5702
4605
4606
4607
4608
4609
4611
4632
4633
5942
5951
5939
5941
5945
5946
5948
5949
5927
5950
5940
5911
5912
5913
5914
5915
5916
5917
5918
5919
5920
5921
5922
5923
5924
5928
5929
5930
5925
5926
3615
3613
3614
3612
3610
3611
3616
3617
3683
3707
3714
3717
3716
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
71
56
57
58
59
60
61
62
63
64
80
4
41
V65
1
9
8
20

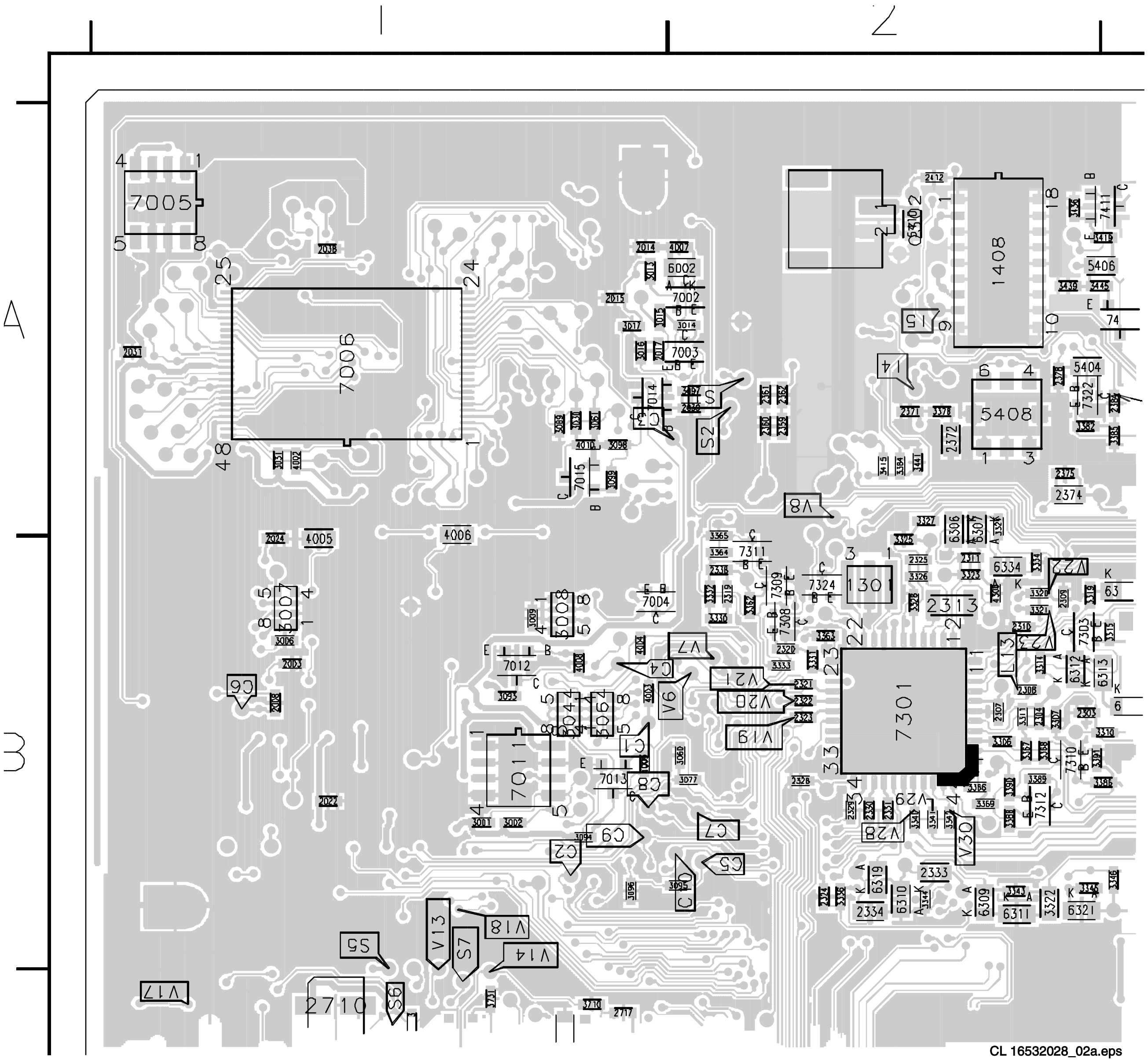
CL 26532028_01c.eps
050202

Layout SSB (Overview Tuner Side)



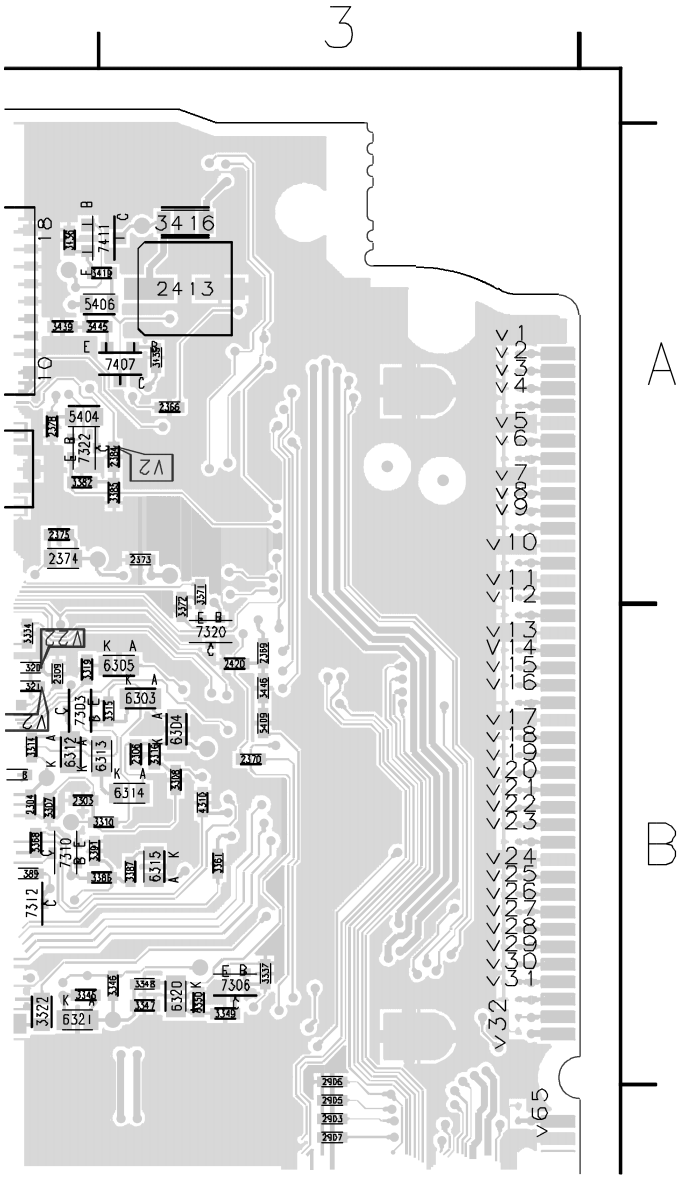
0302	A2
0680	D2
0681	C2
0682	D2
1000	B3
1301	B2
1305	A2
1408	A2
1651	D2
1701	C1
2003	B1
2008	B1
2014	A1
2015	A1
2017	A1
2022	B1
2024	B1
2031	A1
2038	A1
2039	A2
2303	B2
2304	B2
2306	B3
2307	B2
2308	B2
2309	B2
2310	B2
2311	B2
2313	B2
2319	B2
2320	B2
2321	B2
2322	B2
2323	B2
2324	B2
2325	B2
2328	B2
2329	B2
2330	B2
2331	B2
2333	B2
2334	B2
2338	B2
2359	A2
2360	A2
2361	A2
2362	A2
2366	A3
2369	B3
2370	B3
2371	A2
2372	A2
2373	A3
2374	A2
2375	A2
2378	A2
2384	A3
2412	A2
2413	A3
2420	B3
2502	C3
2503	C2
2504	C2
2505	C2
2551	C2
2610	D2
2611	D2
2629	D2
2632	D2
2634	D2
2637	D2
2640	D2
2652	D2
2653	C2
2654	C2
2655	D2
2656	C2
2657	C2
2658	C2
2659	C2
2660	C2
2661	C2
2662	C2
2663	C2
2664	C2
2667	D2
2668	D2
2670	D3
2673	D2
2674	D2
2679	D2
2681	D2
2685	D2
2686	D2
2707	C1
2710	C1
2712	D1
2717	C1
2718	C2
2719	C1
2720	C1
2721	C1
2723	C1
2724	C1
2725	C2
2726	C1
2728	D1
2730	C1
2731	C1
2747	C1
2748	C1
2755	C1
2756	C1
2758	D1
2759	D1
2760	D1
2761	D1
2762	D1
2763	D1
2764	D1
2766	C1
2770	C1
2786	D1
2788	C1
2792	D1
2795	D2
2900	C3
2901	C3
2902	C3
2903	C3
2904	C3
2905	C3
2906	B3
2907	C3
2908	C3
2909	C3
2910	C3
2911	C3
2912	C3
2913	C3
2914	C3
2915	C3
2916	C3
2917	C3
3001	B1
3002	B1
3006	B1
3007	B1
3008	B1
3009	B1
3013	A1
3014	A2
3015	A1
3016	A1
3017	A1
3030	A1
3031	A1
3044	B1
3060	B2
3061	A1
3064	B1
3077	B2
3089	A1
3093	B1
3094	B1
3095	B2
3096	B1
3097	A2
3098	A1
3099	A1
3306	B2
3307	B2
3308	B3
3310	B3
3311	B2
3314	B2
3315	B3
3316	B3
3319	B2
3320	B2
3321	B2
3322	B2
3323	B2
3324	A2
3325	B2
3326	B2
3327	A2
3328	B2
3330	B2
3331	B2
3332	B2
3333	B2
3334	B2
3336	B2
3337	B3
3340	B2
3341	B2
3342	B2
3343	B2
3344	B2
3345	B2
3346	B3
3347	B3
3348	B3
3349	B3
3350	B3
3361	B3
3362	B2
3363	B2
3364	B2
3365	A2
3366	B2
3367	B2
3368	B2
3369	B2
3371	A3
3372	B3
3378	A2
3382	A2
3384	A2
3385	A3
3386	B3
3387	B3
3388	B2
3389	B2
3390	B2
3391	B2
3415	A2
3416	A3
3419	A3
3435	A3
3436	A2
3439	A2
3441	A2
3445	A2
3446	B3
3544	D3
3545	D3
3551	C2
3621	D3
3624	D3
3625	D3
3630	D3
3634	D3
3637	D3
3651	C2
3652	C2
3653	C2
3654	C2
3655	D2
3656	D2
3658	D3
3660	D3
3662	D3
3673	C3
3680	D3
3684	C3
3685	C2
3686	C3
3687	C2
3688	C2
3689	C2
3690	C2
3691	C2
3696	D2
3707	C1
3708	C1
3709	C1
3710	C1
3711	C1
3712	C1
3713	C1
3718	C1
3719	C1
3720	C1
3721	C1
3722	C1
3725	C1
3730	C1
3731	C1
3732	C1
3740	C1
3741	C1
3744	C1
3745	C1
3746	D1
3747	C2
3748	C2
3749	C2
3754	C1
3793	D1
3794	D1
3795	D1
3796	C1
3798	C1
4002	A1
4003	B1
4004	B1
4005	B1
4006	A1
4007	A2
4008	B1
4009	B1
4010	A1
4306	B2
4310	B3
4604	D3
4610	D3
4612	D2
4614	D2
4620	D2
4621	C2
4630	C3
4631	D3
4634	C2
4635	C2
4650	D2
4651	C2
4652	C2
4676	C2
4677	D2
4680	D3
4681	D3
4703	C1
4707	D1
4708	D1
4709	D1
4710	D1
4711	C1
4724	D1
4725	D1
4728	D1
4735	D1
4736	D1
4790	D1
5404	A2
5406	A3
5408	A2
5409	B3
5410	A2
5651	D3
5652	D3
5701	D1
5703	D1
5704	C1
5705	C1
5706	C1
5708	C1
5709	C1
5710	C1
5718	C1
5720	C1
6002	A2
6303	B3
6304	B3
6305	B3
6306	A2
6307	A2
6309	B2
6310	B2
6311	B2
6312	B2
6313	B3
6314	B3
6315	B3
6319	B2
6320	B3
6321	B2
6334	A2
6651	C2
7002	A2
7003	A2
7004	B1
7005	A1
7006	A1
7011	B1
7012	B1
7013	B1
7014	A2
7015	A1
7301	B2
7303	B2
7306	B3
7308	B2
7309	B2
7310	B2
7311	A2
7312	B2
7320	B3
7322	A2
7324	B2
7407	A2
7411	A3
7651	D2
7652	C3
7656	D3
7661	D3
7701	C1
7702	C1
7708	D1
7713	D1
7716	C1

Layout SSB (Part 1 Tuner Side)


1
2
A
B
7005
7006
1408
5408
5406
5404
7301
1301
7011
7012
7013
7004
7002
7003
7014
7015
7311
7324
7308
7309
7303
7310
7312
7322
7411
5008
5044
5064
5007
2710
2313
2333
2334
2372
2374
6002
6306
6307
6334
6309
6310
6311
6312
6313
6319
6321
3322
4005
4006
V6
V7
V8
V13
V14
V17
V18
V19
V20
V21
V22
V23
V28
V29
V30
C1
C2
C4
C5
C6
C7
C8
C9
C10
S2
S5
S6
S7
I4
I5
L13

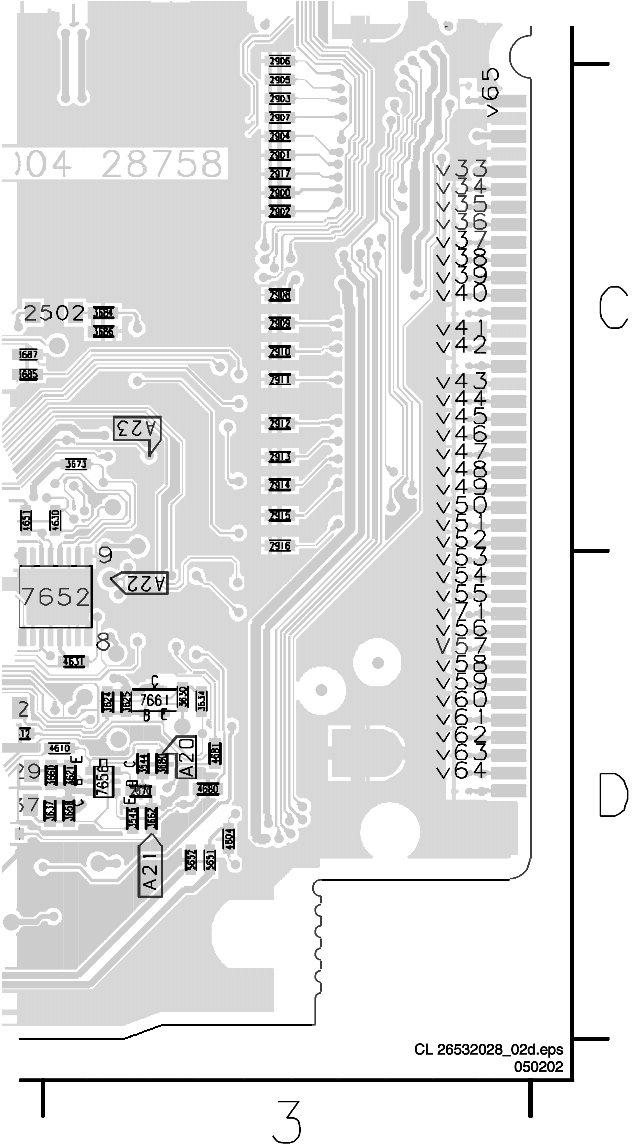
CL 16532028_02a.eps
050202

Layout SSB (Part 2 Tuner Side)


3
A
B
3416
2413
5406
7407
7411
5404
7322
V2
2374
7320
6305
6303
6304
7305
6312
6313
6314
7310
6315
7312
7306
6320
6321
3322
v65
v32

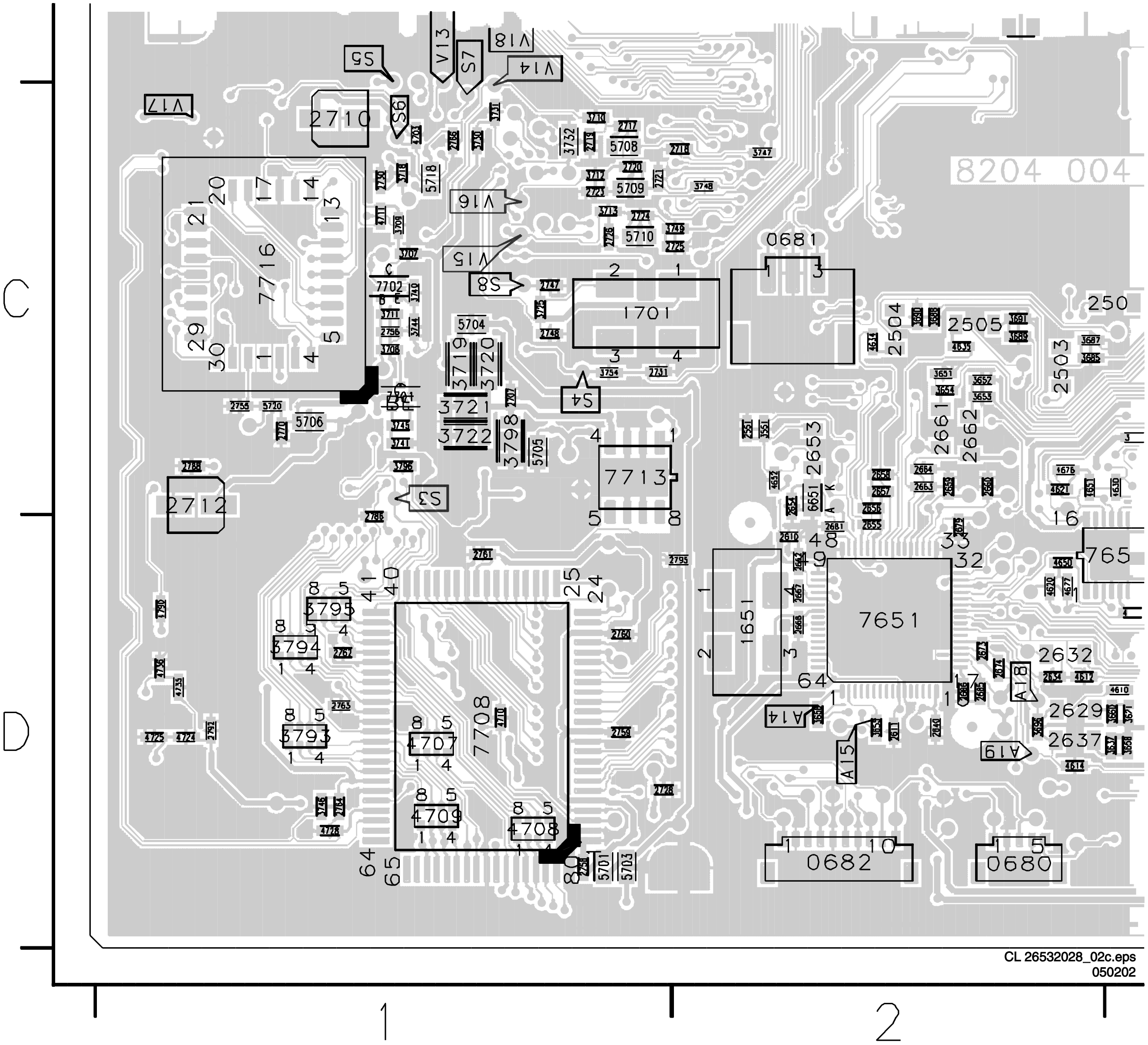
CL 26532028_02b.eps
050202

Layout SSB (Part 4 Tuner Side)


004 28758
v65
C
D
3
2502
A23
A22
7652
7661
A20
A21
7656

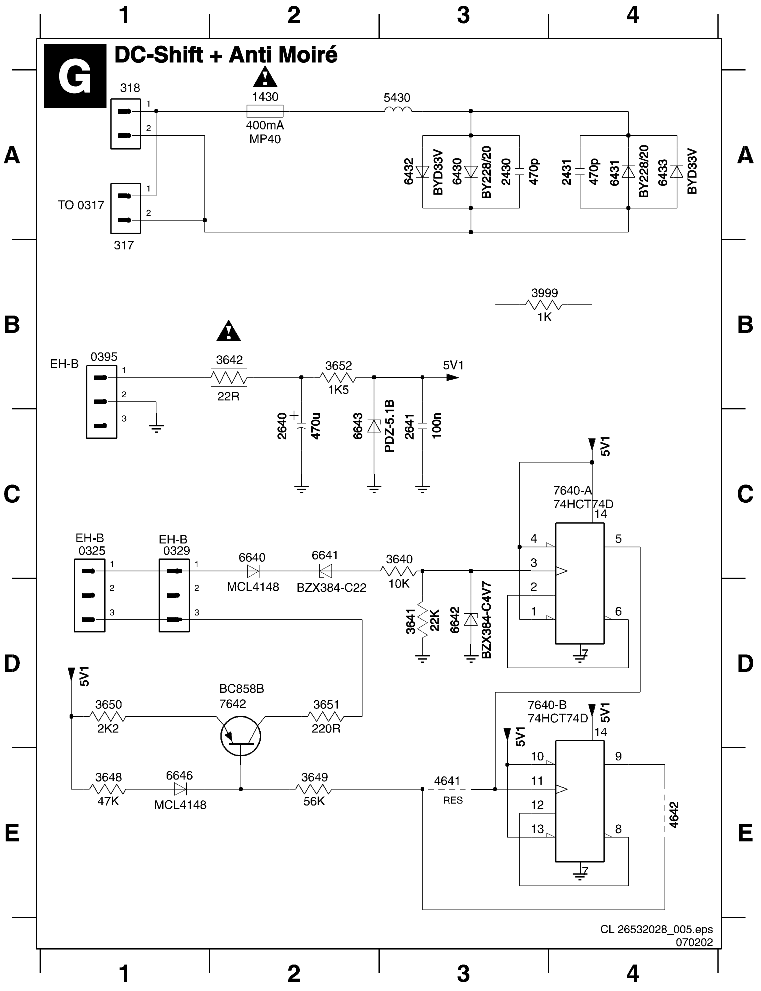
CL 26532028_02d.eps
050202

Layout SSB (Part 3 Tuner Side)


C
D
1
2
S5
V13
S7
V18
V14
V17
2710
S6
8204 004
7716
V16
V15
S8
0681
1701
7702
5704
3719
3720
3721
3722
3798
5705
S4
250
2505
2504
2503
2661
2662
2653
6651
7713
2712
S3
765
7651
1651
5708
5709
5710
5718
3732
3747
3748
5706
3795
3794
3793
4707
4709
4708
7708
2632
2629
2637
A18
A14
A15
A19
0682
0680
5701
5703

CL 26532028_02c.eps
050202

DC-Shift + Anti Moiré

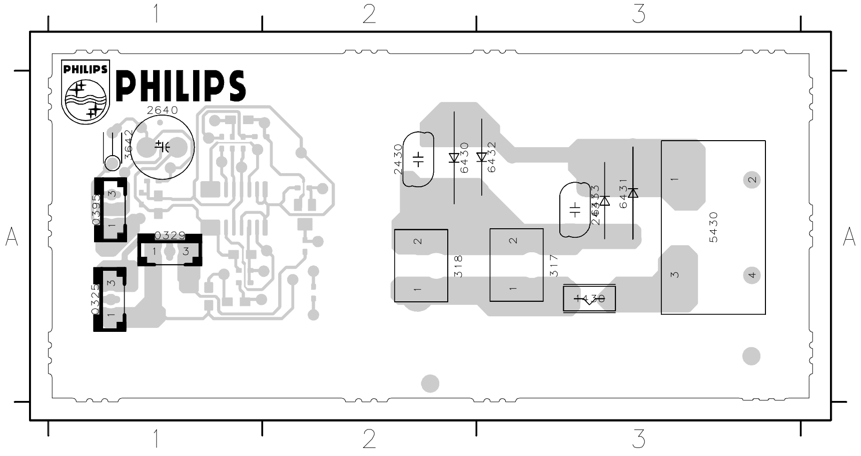

G
DC-Shift + Anti Moiré
1
2
3
4
A
B
C
D
E
318
TO 0317
317
1430
400mA
MP40
5430
6432
BYD33V
6430
BY228/20
2430
470p
2431
470p
6431
BY228/20
6433
BYD33V
3999
1K
EH-B
0395
3642
22R
3652
1K5
5V1
2640
470u
6643
PDZ-5.1B
2641
100n
7640-A
74HCT74D
14
EH-B
0325
EH-B
0329
6640
MCL4148
6641
BZX384-C22
3640
10K
3641
22K
6642
BZX384-C4V7
5V1
BC858B
7642
3650
2K2
3651
220R
3648
47K
6646
MCL4148
3649
56K
4641
RES
7640-B
74HCT74D
4642

CL 26532028_005.eps
070202

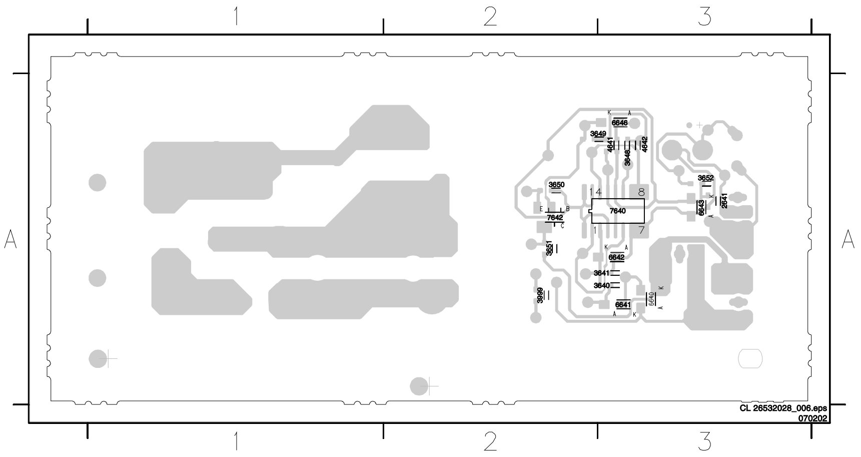
317	B1
318	A1
0325	C1
0329	C1
0395	B1
1430	A2
2430	A3
2431	A4
2640	C2
2641	C3
3640	C3
3641	D3
3642	B2
3648	E1
3649	E2
3650	D1
3651	D2
3652	B2
3999	B3
4641	E3
4642	E4
5430	A3
6430	A3
6431	A4
6432	A3
6433	A4
6640	C2
6641	C2
6642	D3
6643	C2
6646	E1
7640-A	C4
7640-B	D3
7642	D2

Layout DC-Shift + Anti Moiré

0317	A3
0318	A2
0325	A1
0329	A1
0395	A1
1430	A3
2430	A2
2431	A3
2640	A1
3642	A1
5430	A3
6430	A2
6431	A3
6432	A3
6433	A3


1
2
3
A
PHILIPS
2640
3642
0395
0329
0325
2430
6430
6432
318
317
2643
6431
1430
5430

0317	A1
0318	A2
0325	A3
0329	A3
0395	A3
1430	A1
2430	A2
2431	A1
2640	A3
2641	A3
3640	A3
3641	A3
3642	A3
3648	A3
3649	A3
3650	A2
3651	A2
3652	A3
3999	A2
4641	A3
4642	A3
5430	A1
6430	A2
6431	A1
6432	A1
6433	A1
6640	A3
6641	A3
6642	A3
6643	A3
6646	A3
7640	A3
7642	A2


1
2
3
A
6646
3649
3650
3652
7640
7642
3651
6642
3641
3640
3999
6641

CL 26532028_006.eps
070202

Personal Notes:

Personal Notes:

Colour television **Chassis**

EM2E

AA 02.02

Service
Service
Service

Service Information

New Side I/O, Top Control and Mains Switch Panel

In week 225 the following panels are introduced in the set 29PT8607:

- Mains Switch Panel **[K]**
- Side I/O Panel **[L]**
- Top Control Panel **[M]**

In this service information the (changed) schematics, PCB layouts and spare parts list are given. To use the existing Block diagrams, wiring diagrams, I^{2}C overviews, supply line overview and chassis overview the schematics character **[E]** has to be replaced by **[K]**, **[O]** by **[L]** and **[P]** by **[M]**.

Neues Side I/O, Top Control und Mains Switch Panel

In der Woche 225 wurden folgende neue Platinen zusammen mit dem Modell 29PT8607 introduziert:

- Netzschalterplatine (Main-Switch-Panel) **[K]**
- Seitliche E/A-Platine (Side I/O-Panel) **[L]**
- Lokale Ortsbedienung (Top Control Panel) **[M]**

Mit dieser Serviceinformation werden die (änderten) zugehörigen Schaltbilder, das Platinenlayout und die Ersatzteil-Stücklisten veröffentlicht. Um die bereits bestehenden Block- und Verkabelungsdiagramme, die I^{2}C-Bus-Übersicht sowie die Übersichten der Spannungsversorgungsleitungen bzw. der Chassisausführungen weiter nutzen zu können müssen folgenden Einzelschaltbilder ersetzt werden: Diagramm **[E]** durch Diagramm **[K]**, **[O]** durch **[L]** und Diagramm **[P]** durch **[M]**.

Nouvelles platines E/S, Commande supérieure, Platine Commutateur Secteur.

Depuis la semaine 225 les platines suivantes sont introduites dans l'appareil 29PT8607:

- Platine commutateur secteur **[K]**
- Platine E/S de coté **[L]**
- Platine de Commandes en partie supérieure **[M]**

Cette information service done les schémas, implantations et liste des pièces correspondant. Pour utiliser les schémas bloc, de cablage, I^{2}C, alimentation et vue d'ensemble du châssis les repères de schéma **[E]** doivent être remplacés par **[K]**, **[O]** par **[L]** et **[P]** par **[M]**.

©Copyright 2002 Philips Consumer Electronics B.V. Eindhoven, The Netherlands. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by RB 0266 Service PaCE Printed in the Netherlands Subject to modification 3122 785 40640

PHILIPS

Spare parts list

Mains Switch Panel [K]

Various

0157▲	3104 311 02421	Cable 5p 480mm
0177▲	3104 311 03011	Cable 2p 340mm
0201	2422 025 16268	2p male
0202	2422 025 16268	2p male
0203	2422 025 06353	5p male
1910	9322 127 54667	IR receiver TSOP1836UH1
1951	2422 128 02972	Power switch

-||-

2930	4822 124 41584	100µF 20% 10V
2931	4822 124 41796	22µF 20% 16V
2932	4822 124 11913	22nF 20% 275V

-▭-

3957	4822 053 21335	3.3MΩ 5% 0.5W
3966	4822 053 21335	3.3MΩ 5% 0.5W
3978	4822 051 30101	100Ω 5% 62mW
3981	4822 051 30392	3kΩ9 5% 63mW
3982	4822 116 52219	330Ω 5% 0.5W
3985	4822 117 13632	100kΩ 1% 620mW
3986	4822 051 30221	220Ω 5% 62mW
3988	4822 051 30479	47Ω 5% 62mW
3989	4822 051 30102	1kΩ 5% 62mW
3990	4822 117 13632	100kΩ 1% 620mW
3991	4822 050 11002	1kΩ 1% 0.4W

-▶|-

6901	9322 050 99682	LTL-10224WHCR
6954	4822 130 30621	1N4148

-Ⓚ-▭

7900	3198 010 42320	BC857BW
7901	3198 010 42310	BC847BW
7902	4822 130 11418	TCDT1102G

Side I/O panel [L]

Various

0240	2422 025 12485	Conn 11P
1254	4822 267 31014	Headphone socket
1255	4822 265 11606	Conn 3P

-||-

2286	4822 122 33642	150pF 5% 50V
2288	4822 122 33642	150pF 5% 50V
2292	5322 122 32311	470pF 10% 100V
2294	5322 122 32311	470pF 10% 100V
2296	4822 122 30043	10nF 80% 63V
2297	4822 122 30043	10nF 80% 63V

-▭-

3285	4822 116 52201	75Ω 5% 0.5W
3286	4822 116 52176	10Ω 5% 0.5W
3287	4822 116 52201	75Ω 5% 0.5W
3288	4822 116 52176	10Ω 5% 0.5W
3289	4822 116 52249	1k8 5% 0.5W
3291	4822 050 11002	1k 1% 0.4W
3292	4822 117 10834	47k 1% 0.1W
3293	4822 050 11002	1k 1% 0.4W
3294	4822 117 10834	47k 1% 0.1W
3295	4822 116 52276	3k9 5% 0.5W
3296	4822 117 10833	10k 1% 0.1W
3297	4822 117 10833	10k 1% 0.1W

-▶|-

6291	9340 548 61115	PDZ12B
6292	9340 548 61115	PDZ12B
6293	9340 548 61115	PDZ12B
6294	9340 548 61115	PDZ12B

Top Control Panel [M]

Various

0215	4822 267 10748	3P
1091	4822 276 13775	Switch
1092	4822 276 13775	Switch
1093	4822 276 13775	Switch
1094	4822 276 13775	Switch

-▭-

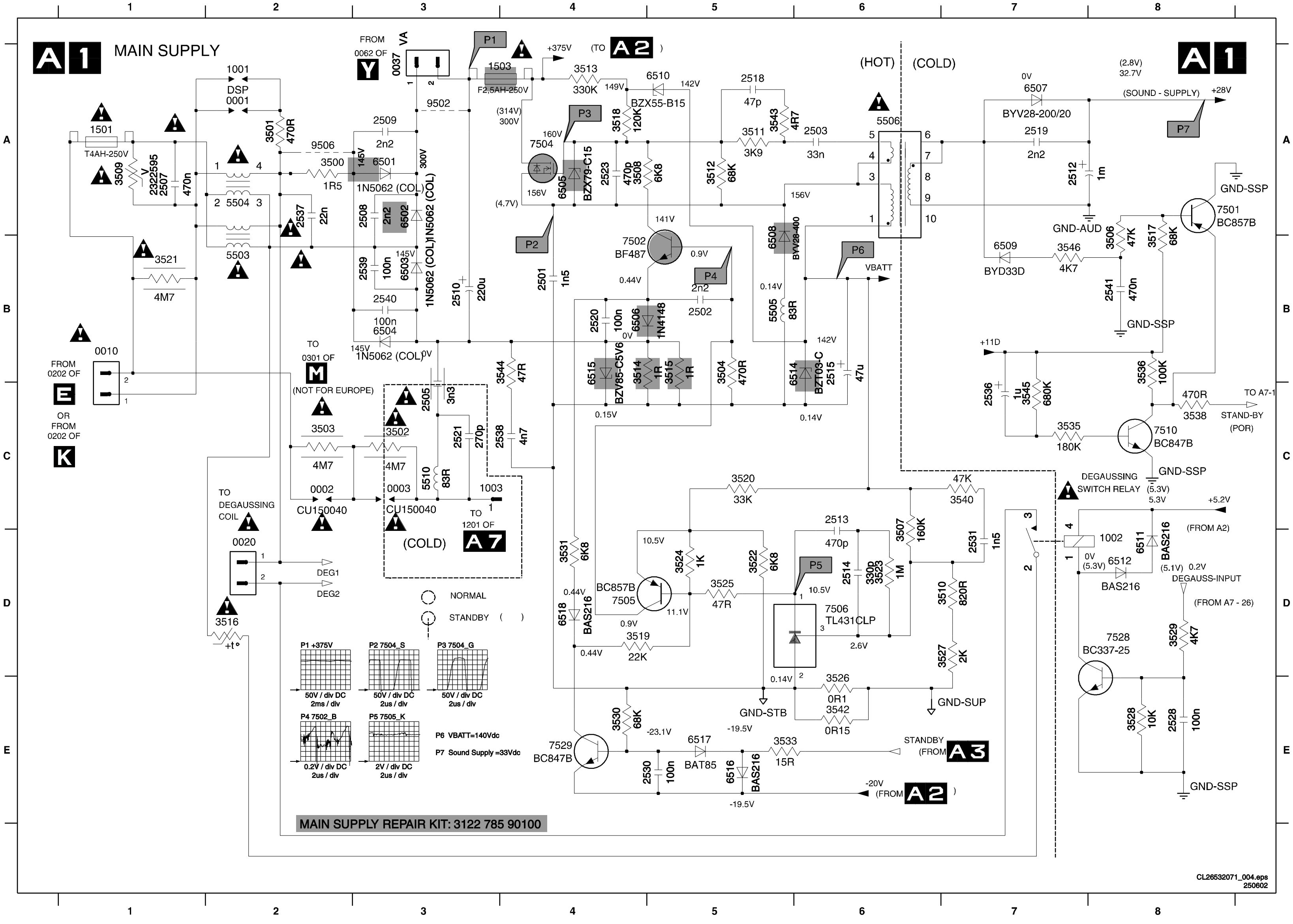
3091	4822 051 20561	560Ω 5% 0.1W
3092	4822 051 20391	390Ω 5% 0.1W
3093	4822 051 20561	560Ω 5% 0.1W
3094	4822 117 11504	270Ω 1% 0.1W
3095	4822 051 20332	3k3 5% 0.1W
3096	4822 117 11139	1k5 1% 0.1W

-▶|-

6091	4822 130 31983	BAT85
8345	4822 320 12511	3P 1500mm

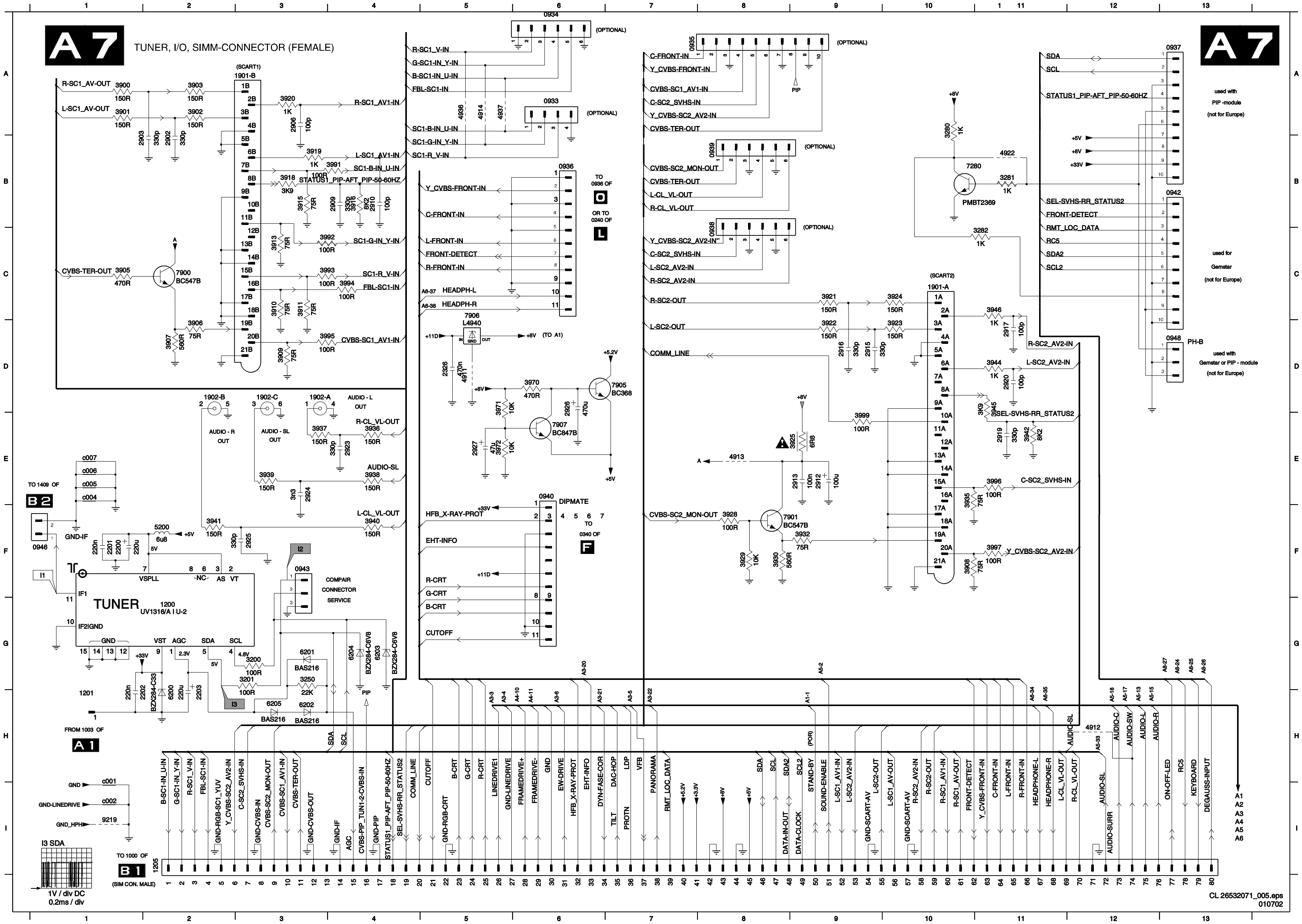
Electrical Diagrams and PWB's

Large Signal Panel: Main Supply


A1 MAIN SUPPLY
1 2 3 4 5 6 7 8
A B C D E
FROM 0062 OF Y
0037 VA
P1 P2 P3 P4 P5 P6 P7
+375V (TO A2)
1503 F2,5AH-250V
3513 330K 149V
6510 142V BZX55-B15
2518 47p
(HOT) (COLD)
1001 DSP 0001
1501 T4AH-250V
3509 V 2322595
2507 470n
5504
5503
3521 4M7
3501 470R
9506
3500 1R5
6501 1N5062 (COL)
6502 2n2 2508
6503 1N5062 (COL)
2539 100n
2540 100n
6504 1N5062 (COL)
2509 2n2
9502
300V
2510 220u
2537 22n
(314V) 300V
7504
160V 156V (4.7V)
6505 BZX79-C15
2523 470p
3508 6K8
3518 120K
3511 3K9
3543 4R7
2503 33n
3512 68K
5506
7502 BF487
141V 0.9V 0.44V 0V
2501 1n5
2502 2n2
2520 100n
6506 1N4148
6508 BYV28-400
156V 0.14V
5505 83R
VBATT
142V
6515 BZV85-C5V6
3514 1R
3515 1R
3504 470R
6514 BZT03-C
2515 47u
0.15V 0.14V
3544 47R
2538 4n7
2505 3n3
2521 270p
5510 83R
1003 TO 1201 OF A7
(COLD)
0010 FROM 0202 OF E OR FROM 0202 OF K
TO 0301 OF M (NOT FOR EUROPE)
3503 4M7
3502 4M7
0002 CU150040
0003 CU150040
TO DEGAUSSING COIL
0020 DEG1 DEG2
3516 +t°
NORMAL
STANDBY ( )
P1 +375V 50V / div DC 2ms / div
P2 7504_S 50V / div DC 2us / div
P3 7504_G 50V / div DC 2us / div
P4 7502_B 0.2V / div DC 2us / div
P5 7505_K 2V / div DC 2us / div
P6 VBATT=140Vdc
P7 Sound Supply =33Vdc
3520 33K
3540 47K
10.5V
3524 1K
3522 6K8
BC857B 7505
11.1V
3525 47R
2513 470p
2514 330p
3523 1M
3507 160K
2531 1n5
7506 TL431CLP
2.6V 0.14V
3531 6K8
6518 BAS216
0.44V 0.9V
3519 22K
3530 68K
-23.1V
7529 BC847B
2530 100n
6517 BAT85
6516 BAS216
-19.5V
3533 15R
3526 0R1
3542 0R15
GND-STB
GND-SUP
STANDBY (FROM A3
-20V (FROM A2)
3510 820R
3527 2K
MAIN SUPPLY REPAIR KIT: 3122 785 90100
0V 6507 BYV28-200/20
(2.8V) 32.7V
(SOUND - SUPPLY) +28V
2519 2n2
2512 1m
GND-AUD
6509 BYD33D
3546 4K7
3506 47K
3517 68K
2541 470n
GND-SSP
7501 BC857B
+11D
2536 1u
3545 680K
3536 100K
470R 3538
TO A7-1 STAND-BY (POR)
3535 180K
7510 BC847B
DEGAUSSING SWITCH RELAY (5.3V) 5.3V
+5.2V (FROM A2)
1002
6511 BAS216
6512 BAS216
0V (5.3V) (5.1V) 0.2V
DEGAUSS-INPUT (FROM A7 - 26)
3529 4K7
7528 BC337-25
3528 10K
2528 100n
CL26532071_004.eps 250602

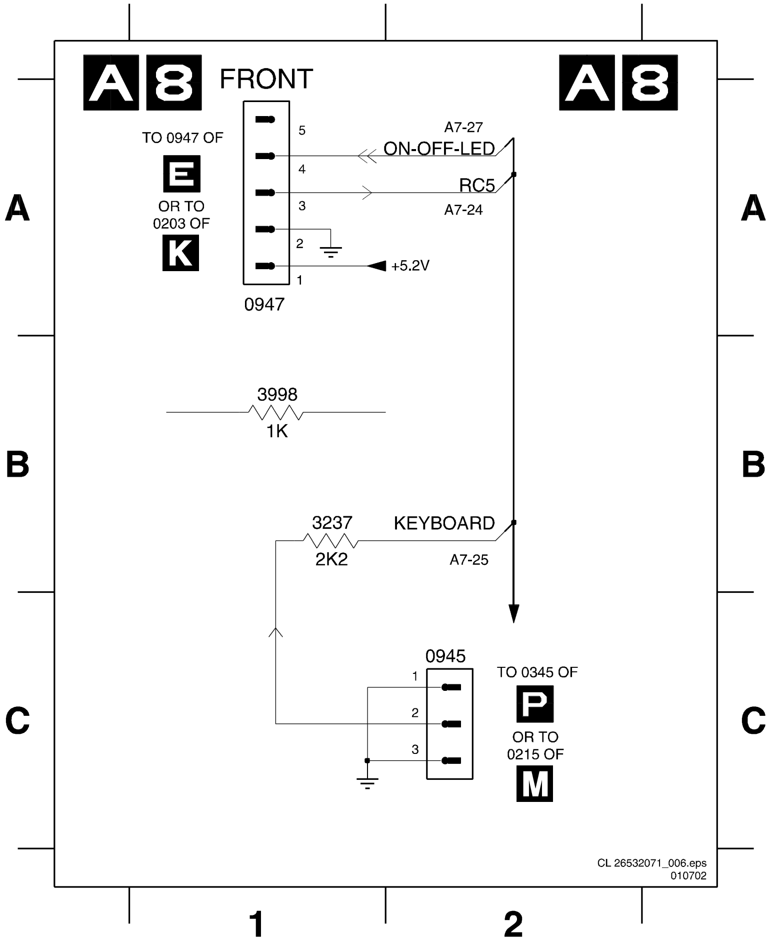
0001	A2
0002	C2
0003	C3
0010	B1
0020	D2
0037	A3
1001	A2
1002	D8
1003	C4
1501	A1
1503	A3
2501	B4
2502	B5
2503	A6
2505	C3
2507	A1
2508	A3
2509	A3
2510	B3
2512	A7
2513	C6
2514	D6
2515	B6
2518	A5
2519	A7
2520	B4
2521	C3
2523	A4
2528	E8
2530	E5
2531	D7
2536	C7
2537	A2
2538	C4
2539	B3
2540	B3
2541	B8
3500	A2
3501	A2
3502	C3
3503	C2
3504	B5
3506	B8
3507	D6
3508	A4
3509	A1
3510	D7
3511	A5
3512	A5
3513	A4
3514	B4
3515	B5
3516	D2
3517	B8
3518	A4
3519	D4
3520	C5
3521	B1
3522	D5
3523	D6
3524	D5
3525	D5
3526	E6
3527	D7
3528	E8
3529	D8
3530	E4
3531	D4
3533	E5
3535	C7
3536	B8
3538	C8
3540	C7
3542	E6
3543	A5
3544	B4
3545	C7
3546	B7
5503	B2
5504	A2
5505	B5
5506	A6
5510	C3
6501	A3
6502	A3
6503	B3
6504	B3
6505	A4
6506	B4
6507	A7
6508	B5
6509	B7
6510	A5
6511	D8
6512	D8
6514	B6
6515	B4
6516	E5
6517	E5
6518	D4
7501	A8
7502	B4
7504	A4
7505	D4
7506	D6
7510	C8
7528	D8
7529	E4
9502	A3
9506	A2

Large Signal Panel: Tuner, I/O, SIMM Connector (Female)


A7
TUNER, I/O, SIMM-CONNECTOR (FEMALE)
(SCART1)
1901-B
R-SC1_AV-OUT
L-SC1_AV-OUT
CVBS-TER-OUT
7900
BC547B
R-SC1_AV1-IN
L-SC1_AV1-IN
SC1-B-IN_U-IN
STATUS1_PIP-AFT_PIP-50-60HZ
SC1-G-IN_Y-IN
SC1-R_V-IN
FBL-SC1-IN
CVBS-SC1_AV1-IN
R-SC1_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
FBL-SC1-IN
0934
(OPTIONAL)
0933
(OPTIONAL)
SC1-B-IN_U-IN
SC1-G-IN_Y-IN
SC1-R_V-IN
0936
Y_CVBS-FRONT-IN
C-FRONT-IN
L-FRONT-IN
FRONT-DETECT
R-FRONT-IN
HEADPH-L
HEADPH-R
TO 0936 OF
O
OR TO 0240 OF
L
7906
L4940
+11D
+8V (TO A1)
7905
BC368
7907
BC847B
+5.2V
+5V
1902-B
1902-C
1902-A
AUDIO - R OUT
AUDIO - SL OUT
AUDIO - L OUT
R-CL_VL-OUT
AUDIO-SL
L-CL_VL-OUT
TO 1409 OF
B2
GND-IF
0946
TUNER
1200
UV1316/A I U-2
IF1
IF2IGND
VSPLL
-NC-
AS
VT
GND
VST
AGC
SDA
SCL
1201
FROM 1003 OF
A1
0943
COMPAIR CONNECTOR SERVICE
BAS216
BZX284-C6V8
BZX284-C33
PIP
0940
DIPMATE
HFB_X-RAY-PROT
EHT-INFO
R-CRT
G-CRT
B-CRT
CUTOFF
TO 0340 OF
F
0935
(OPTIONAL)
C-FRONT-IN
Y_CVBS-FRONT-IN
CVBS-SC1_AV1-IN
C-SC2_SVHS-IN
Y_CVBS-SC2_AV2-IN
CVBS-TER-OUT
0939
(OPTIONAL)
CVBS-SC2_MON-OUT
CVBS-TER-OUT
L-CL_VL-OUT
R-CL_VL-OUT
0938
(OPTIONAL)
Y_CVBS-SC2_AV2-IN
C-SC2_SVHS-IN
L-SC2_AV2-IN
R-SC2_AV2-IN
R-SC2-OUT
L-SC2-OUT
COMM_LINE
(SCART2)
1901-A
7901
BC547B
CVBS-SC2_MON-OUT
R-SC2_AV2-IN
L-SC2_AV2-IN
SEL-SVHS-RR_STATUS2
C-SC2_SVHS-IN
Y_CVBS-SC2_AV2-IN
7280
PMBT2369
4922
A7
0937
SDA
SCL
STATUS1_PIP-AFT_PIP-50-60HZ
used with PIP -module (not for Europe)
0942
SEL-SVHS-RR_STATUS2
FRONT-DETECT
RMT_LOC_DATA
RC5
SDA2
SCL2
used for Gemstar (not for Europe)
0948
PH-B
used with Gemstar or PIP - module (not for Europe)
4912
I3 SDA
1V / div DC
0.2ms / div
TO 1000 OF
B1
(SIM CON. MALE)
1205
GND
GND-LINEDRIVE
GND_HPH
c001
c002
9219
c004
c005
c006
c007
A1
A2
A3
A4
A5
A6
CL 26532071_005.eps
010702

0933	A6
0934	A6
0935	A7
0936	B6
0937	A13
0938	C8
0939	B8
0940	E6
0942	B13
0943	F3
0946	F1
0948	D13
1200	G2
1201	H1
1205	I2
1901-A	C10
1901-B	A2
1902-A	D3
1902-B	D2
1902-C	D3
2200	F1
2201	F1
2202	H1
2203	H2
2902	B2
2903	B2
2906	A3
2909	B4
2910	B4
2912	E9
2913	E9
2915	D9
2916	D9
2917	D11
2919	E11
2920	D11
2923	E4
2924	E3
2925	F3
2926	D6
2927	E5
3200	G3
3201	G3
3250	G3
3280	A10
3281	B11
3282	C11
3900	A1
3901	A1
3902	A2
3903	A2
3905	C1
3906	D2
3907	D2
3908	F10
3909	D3
3910	C3
3911	C3
3913	C3
3915	B3
3916	B4
3918	B3
3919	B3
3920	A3
3921	C9
3922	D9
3923	D10
3924	C10
3925	E9
3928	F8
3929	F8
3930	F8
3932	F9
3935	E10
3936	E4
3937	E3
3938	E4
3939	E3
3940	F4
3941	F2
3942	E11
3944	D11
3945	D11
3946	C11
3970	D6
3971	D5
3972	E5
3991	B4
3992	C3
3993	C3
3994	C4
3995	D3
3996	E11
3997	F11
3999	E9
4911	D5
4912	H12
4913	E8
4914	A5
4922	B11
4934	A12
4936	A5
4937	A5
5200	F2
6200	H2
6201	G3
6202	H3
6203	G4
6204	G4
6205	H3
7280	B11
7900	C2
7901	F8
7905	D7
7906	C5
7907	E6

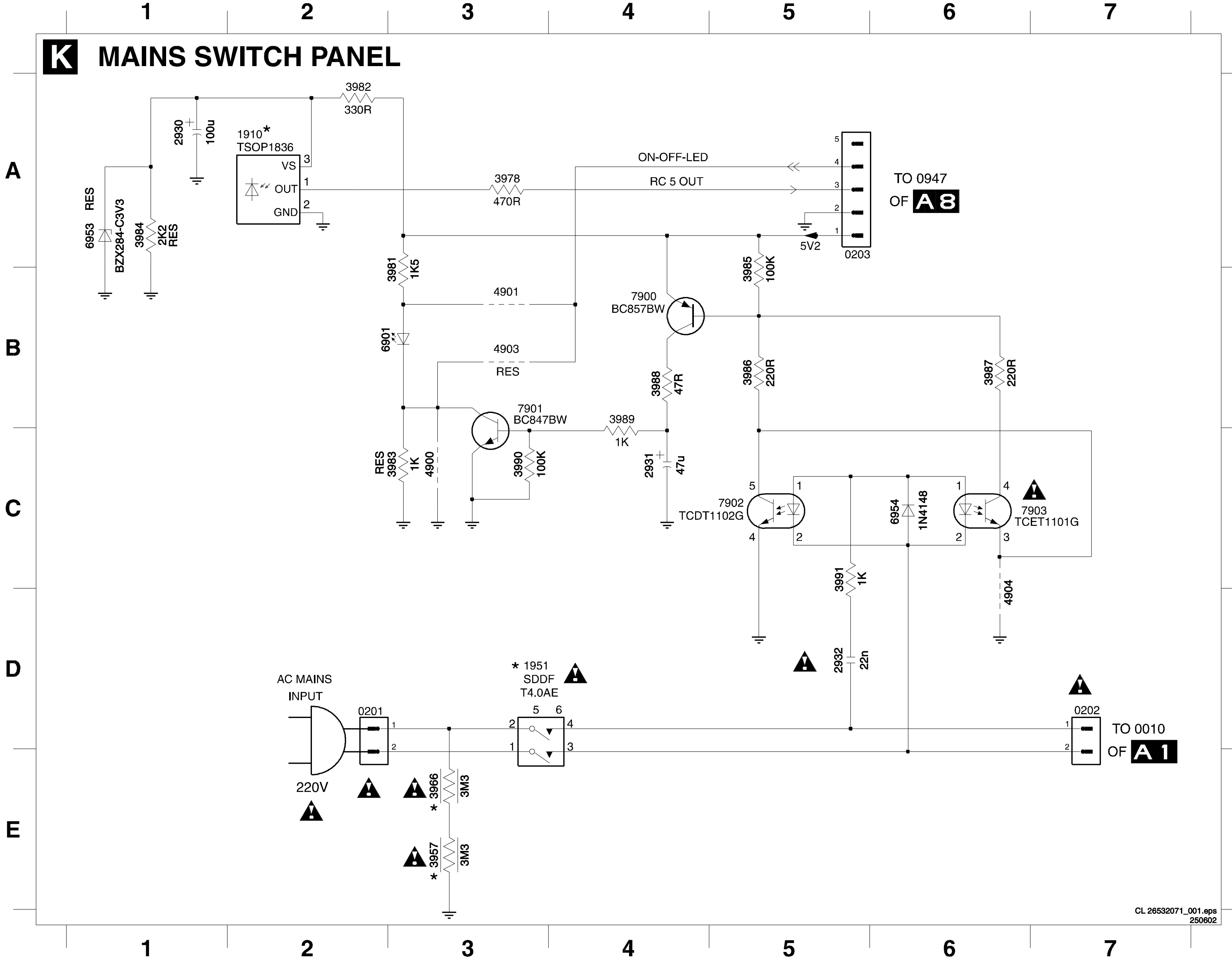
Large Signal Panel: Front



A8
FRONT
A8
TO 0947 OF
E
OR TO
0203 OF
K
0947
5
4
3
2
1
A7-27
ON-OFF-LED
RC5
A7-24
+5.2V
3998
1K
3237
2K2
KEYBOARD
A7-25
0945
1
2
3
TO 0345 OF
P
OR TO
0215 OF
M
CL 26532071_006.eps
010702
A
B
C
1
2

0945 C2
0947 A1
3237 B1
3998 B1

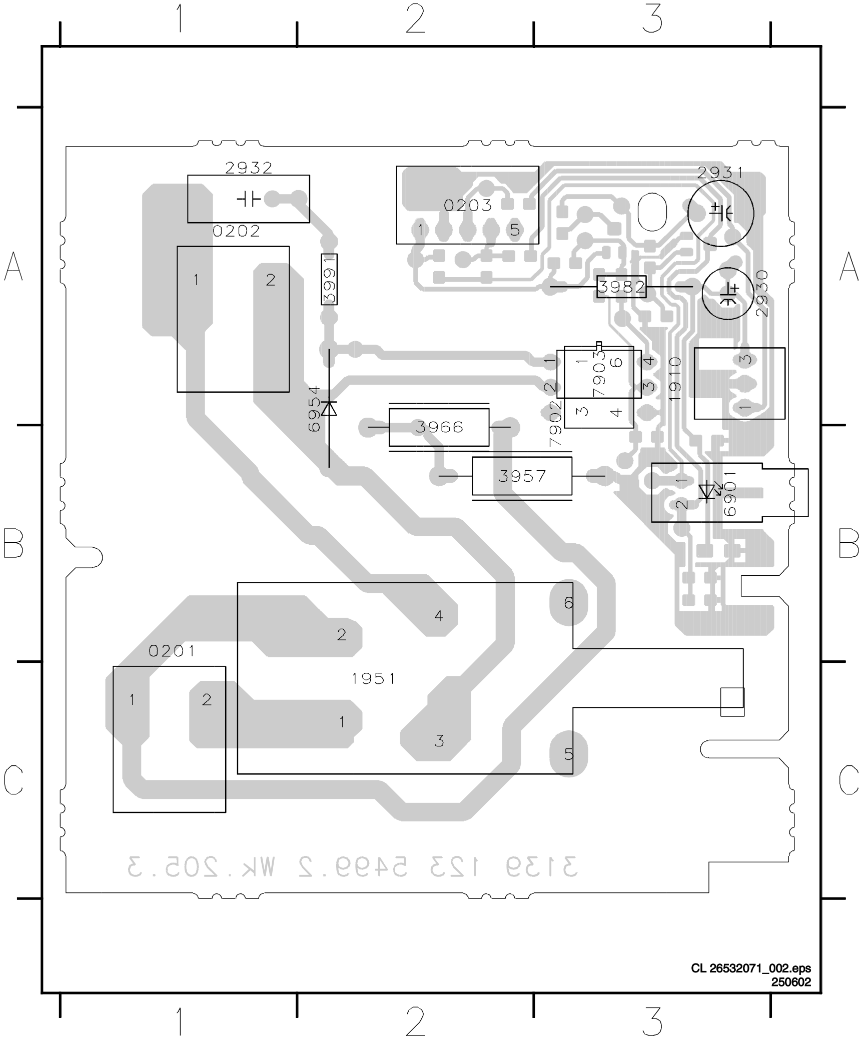
Mains Switch Panel


K
MAINS SWITCH PANEL
1 2 3 4 5 6 7
A B C D E
2930 100u
3982 330R
1910* TSOP1836
VS OUT GND
3978 470R
ON-OFF-LED
RC 5 OUT
TO 0947 OF A8
0203
5V2
6953 RES BZX284-C3V3
3984 2K2 RES
3981 1K5
4901
4903 RES
6901
7900 BC857BW
7901 BC847BW
3985 100K
3986 220R
3987 220R
3988 47R
3989 1K
2931 47u
3990 100K
RES 3983 1K
4900
7902 TCDT1102G
6954 1N4148
7903 TCET1101G
3991 1K
4904
2932 22n
AC MAINS INPUT
220V
0201
* 1951 SDDF T4.0AE
3966 3M3
3957 3M3
0202
TO 0010 OF A1
CL 26532071_001.eps 250602

0201	D2
0202	D7
0203	A5
1910	A2
1951	D3
2930	A1
2931	C4
2932	D5
3957	E3
3966	E3
3978	A3
3981	B3
3982	A2
3983	C3
3984	A1
3985	B5
3986	B5
3987	B6
3988	B4
3989	B4
3990	C3
3991	C5
4900	C3
4901	B3
4903	B3
4904	D6
6901	B3
6953	A1
6954	C6
7900	B4
7901	B3
7902	C5
7903	C6
F903	D3
F904	D6
F905	D3
F906	D6
F907	A5
F908	A5
F909	A5
F910	C2
I901	A1
I902	B3
I903	A2
I904	B2
I905	E3
I906	B5
I907	B4
I908	B5
I909	C6
I910	C4
I911	C4
I912	C6
I913	A5
I914	D5
I915	E3

Layout Mains Switch Panel (Top Side)

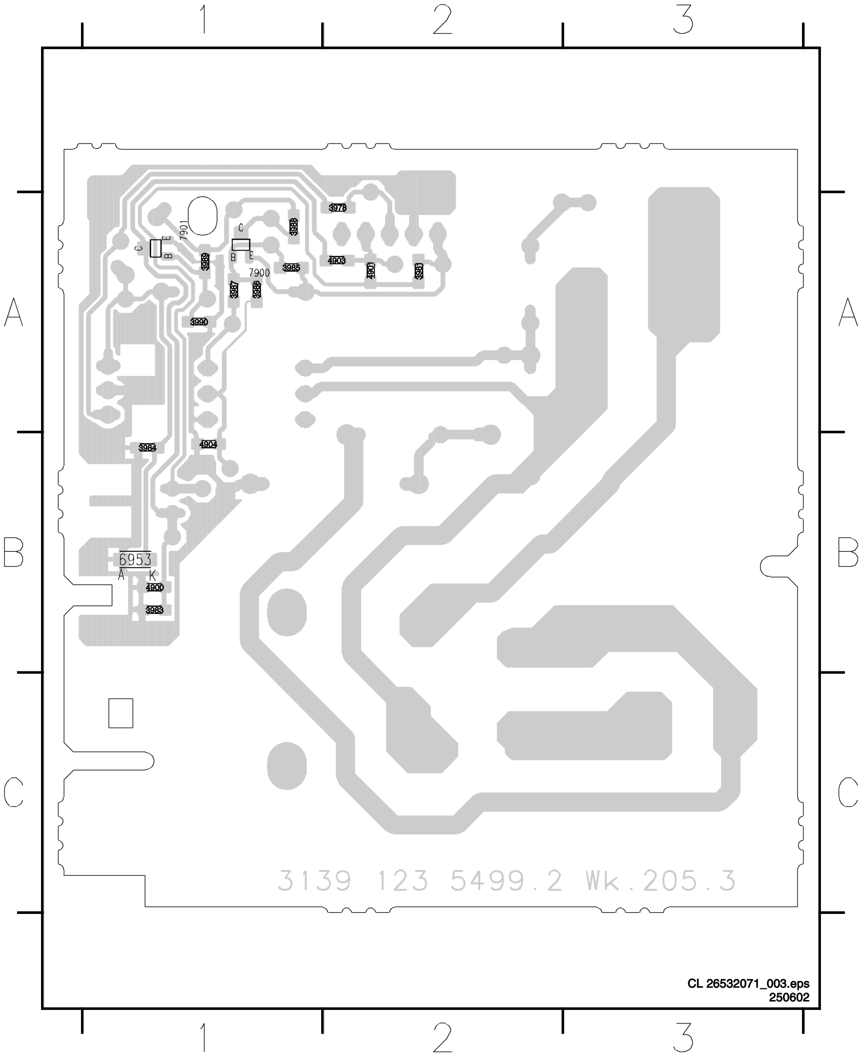
0201	B1	0203	A2	1951	C2	2931	A3	3957	B2	3982	A3	6901	B3	7902	A3
0202	A1	1910	A3	2930	A3	2932	A1	3966	B2	3991	A2	6954	A2	7903	A3


1
2
3
A
B
C
2932
0203
2931
0202
3991
3982
2930
1910
7903
7902
6954
3966
3957
6901
0201
1951
3139 123 5499.2 Wk.205.3

CL 26532071_002.eps
250602

Layout Mains Switch Panel (Bottom Side)

3978	A2	3984	B1	3987	A1	3990	A1	4903	A2	7900	A1
3981	A2	3985	A1	3988	A1	4900	B1	4904	B1	7901	A1
3983	B1	3986	A1	3989	A1	4901	A2	6953	B1		

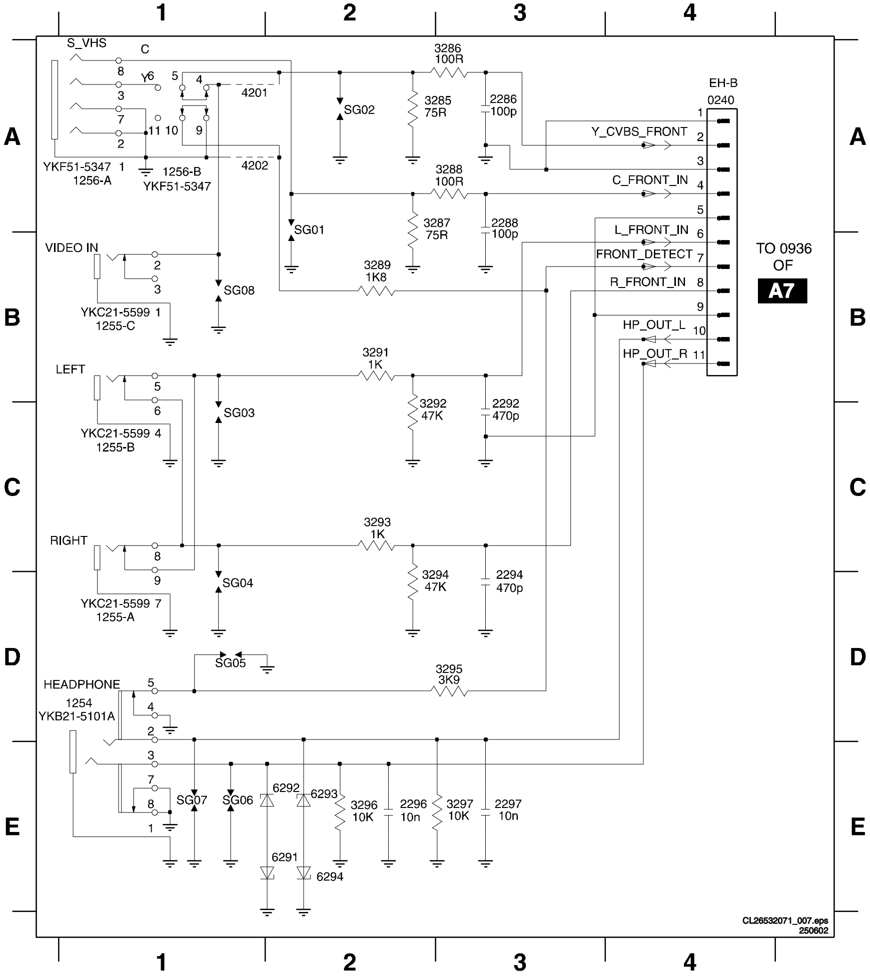

1
2
3
A
B
C
3978
4903
7901
7900
3985
3990
3984
4904
6953
A
K
4900
3983
3139 123 5499.2 Wk.205.3

CL 26532071_003.eps
250602

Side I/O Panel

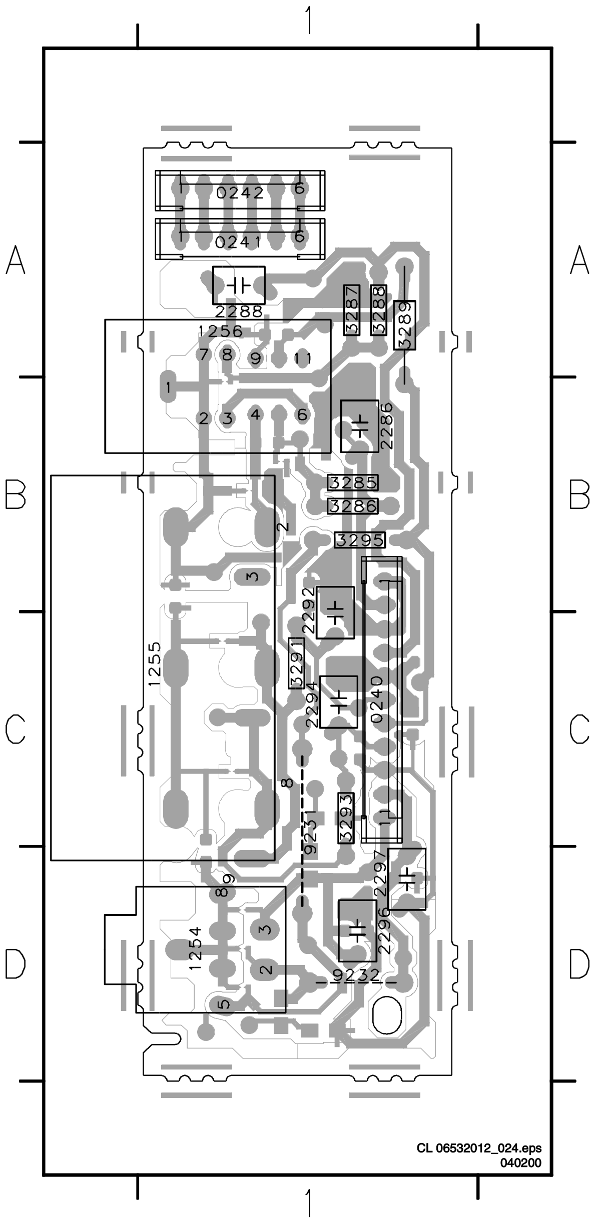
L SIDE IO PANEL

0240 A4
1254 D1
1255-A D1
1255-B C1
1255-C B1
1256-A A1
1256-B A1
2286 A3
2288 A3
2292 B3
2294 C3
2296 E2
2297 E3
3285 A3
3286 A3
3287 A3
3288 A3
3289 B2
3291 B2
3292 B2
3293 C2
3294 C3
3295 D3
3296 E2
3297 E3
4201 A1
4202 A1
6291 E2
6292 E2
6293 E2
6294 E2
SG01 B2
SG02 A2
SG03 C1
SG04 D1
SG05 D1
SG06 E1
SG07 E1
SG08 B1


1
2
3
4
A
B
C
D
E
S_VHS
C
Y
8
6
5
4
3
7
2
11
10
9
YKF51-5347 1
1256-A
1256-B
YKF51-5347
4201
4202
SG02
3286
100R
3285
75R
2286
100p
EH-B
0240
Y_CVBS_FRONT
3288
100R
C_FRONT_IN
SG01
3287
75R
2288
100p
L_FRONT_IN
FRONT_DETECT
R_FRONT_IN
HP_OUT_L
HP_OUT_R
1
2
3
4
5
6
7
8
9
10
11
TO 0936
OF
A7
VIDEO IN
YKC21-5599 1
1255-C
SG08
3289
1K8
LEFT
YKC21-5599 4
1255-B
SG03
3291
1K
3292
47K
2292
470p
RIGHT
YKC21-5599 7
1255-A
SG04
3293
1K
3294
47K
2294
470p
SG05
3295
3K9
HEADPHONE
1254
YKB21-5101A
SG07
SG06
6292
6293
3296
10K
2296
10n
3297
10K
2297
10n
6291
6294
CL26532071_007.eps
250602

Personal Notes:

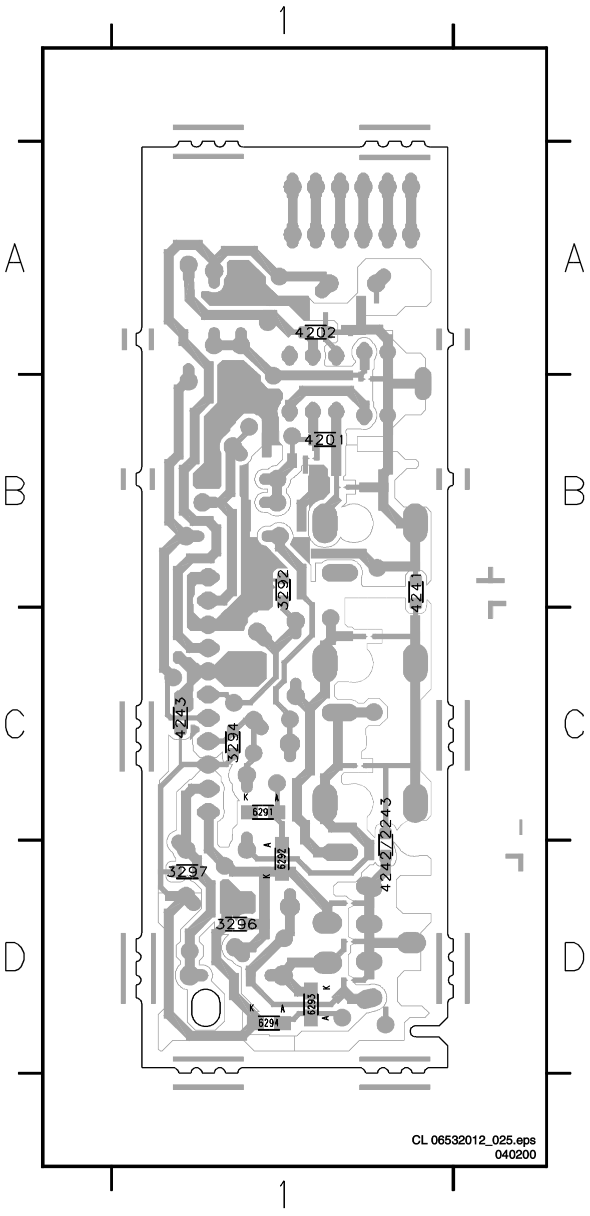
Layout Side I/O Panel (Top Side)


1
A
B
C
D
0242
0241
2288
1256
7 8 9 11
1
2 3 4 6
3287
3288
3289
2286
3285
3286
3295
2
3
2292
3291
2294
0240
1255
8
9231
3293
2297
2296
1254
8 9
3
2
5
9232

CL 06532012_024.eps
040200

0240	C1
0241	A1
0242	A1
1254	D1
1255	C1
1256	A1
2286	B1
2288	A1
2292	B1
2294	C1
2296	D1
2297	D1
3285	B1
3286	B1
3287	A1
3288	A1
3289	A1
3291	C1
3293	C1
3295	B1
9231	C1
9232	D1

Layout Side I/O Panel (Bottom Side)

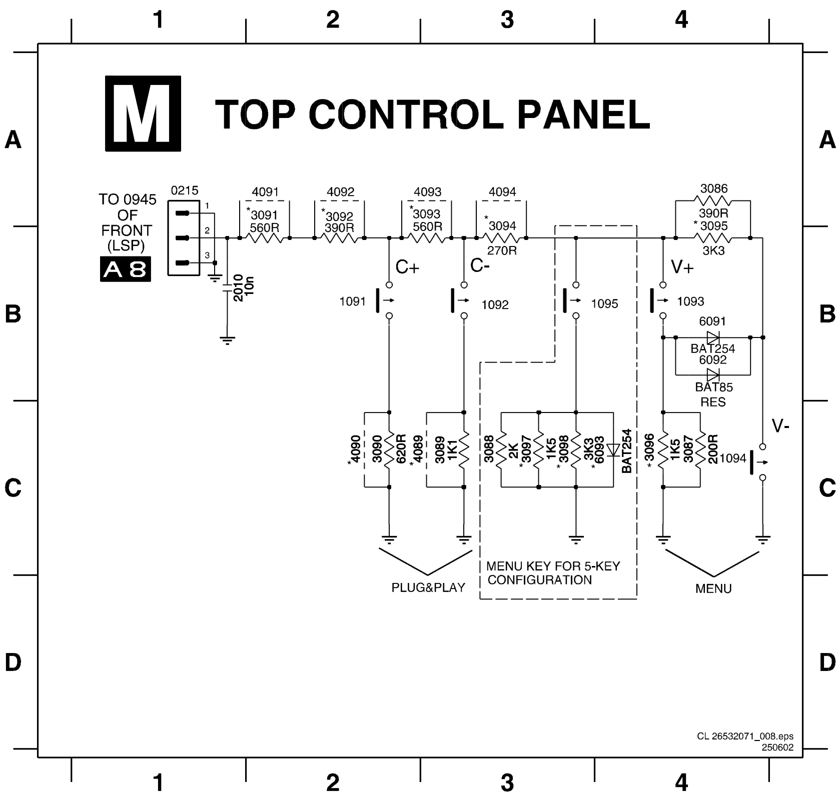

1
A
B
C
D
4202
4201
3292
4241
4243
3294
6291
6292
4242/2243
3297
3296
6293
6294

CL 06532012_025.eps
040200

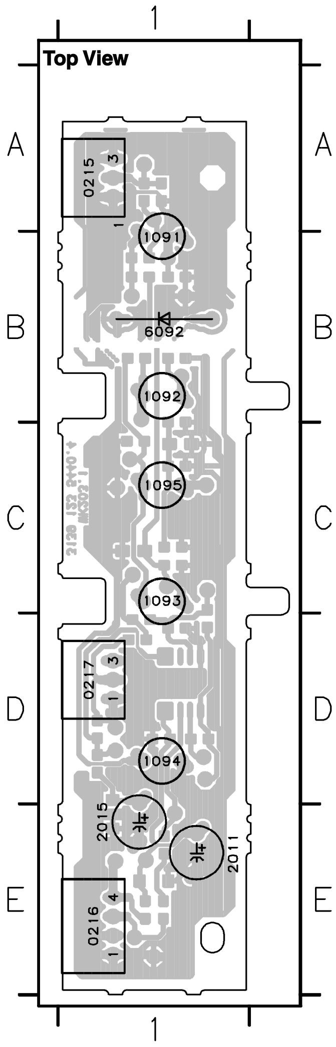
3292	B1
3294	C1
3296	D1
3297	D1
4201	B1
4202	A1
4241	B1
4242/2243	D1
4243	C1
6291	C1
6292	D1
6293	D1
6294	D1

Top Control Panel

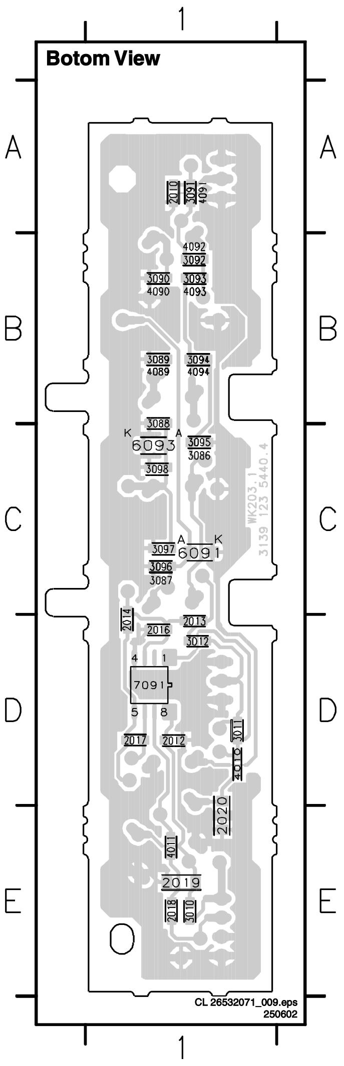
0215	A1
1091	B2
1092	B3
1093	B4
1094	C4
1095	B4
2010	B1
3086	A4
3087	C4
3088	C3
3089	C3
3090	C2
3091	A2
3092	A2
3093	A3
3094	B3
3095	B4
3096	C4
3097	C3
3098	C3
4089	C3
4090	C2
4091	A2
4092	A2
4093	A3
4094	A3
6091	B4
6092	B4
6093	C4


1
2
3
4
A
B
C
D
M
TOP CONTROL PANEL
TO 0945 OF FRONT (LSP)
A8
0215
1
2
3
2010
10n
4091
*3091
560R
4092
*3092
390R
4093
*3093
560R
4094
*3094
270R
3086
390R
*3095
3K3
C+
C-
V+
V-
1091
1092
1095
1093
1094
6091
BAT254
6092
BAT85
RES
*4090
3090
620R
*4089
3089
1K1
3088
2K
*3097
1K5
*3098
3K3
*6093
BAT254
*3096
1K5
3087
200R
PLUG&PLAY
MENU KEY FOR 5-KEY CONFIGURATION
MENU
CL 26532071_008.eps
250602

Layout Top Control Panel


Top View
1
A
B
C
D
E
0215
0216
0217
1091
1092
1093
1094
1095
2011
2015
6092
3
1
4

0215	A1
0216	E1
0217	D1
1091	B1
1092	B1
1093	C1
1094	D1
1095	C1
2011	E1
2015	E1
6092	B1


Botom View
1
A
B
C
D
E
2010
3091
4091
4092
3092
3090
4090
3093
4093
3089
4089
3094
4094
3088
K
6093
A
3095
3086
3098
3097
A
6091
K
3096
3087
2014
2016
2013
3012
4
1
7091
5
8
2017
2012
3011
4010
2020
4011
2019
2018
3010
WK203.1
3139 123 5440.4
CL 26532071_009.eps
250602

2010	A1
2012	D1
2013	D1
2014	D1
2016	D1
2017	D1
2018	E1
2019	E1
2020	E1
3010	E1
3011	D1
3012	D1
3086	C1
3087	C1
3088	B1
3089	B1
3090	B1
3091	A1
3092	B1
3093	B1
3094	B1
3095	C1
3096	C1
3097	C1
3098	C1
4010	D1
4011	E1
4089	B1
4090	B1
4091	A1
4092	B1
4093	B1
4094	B1
6091	C1
6093	C1
7091	D1